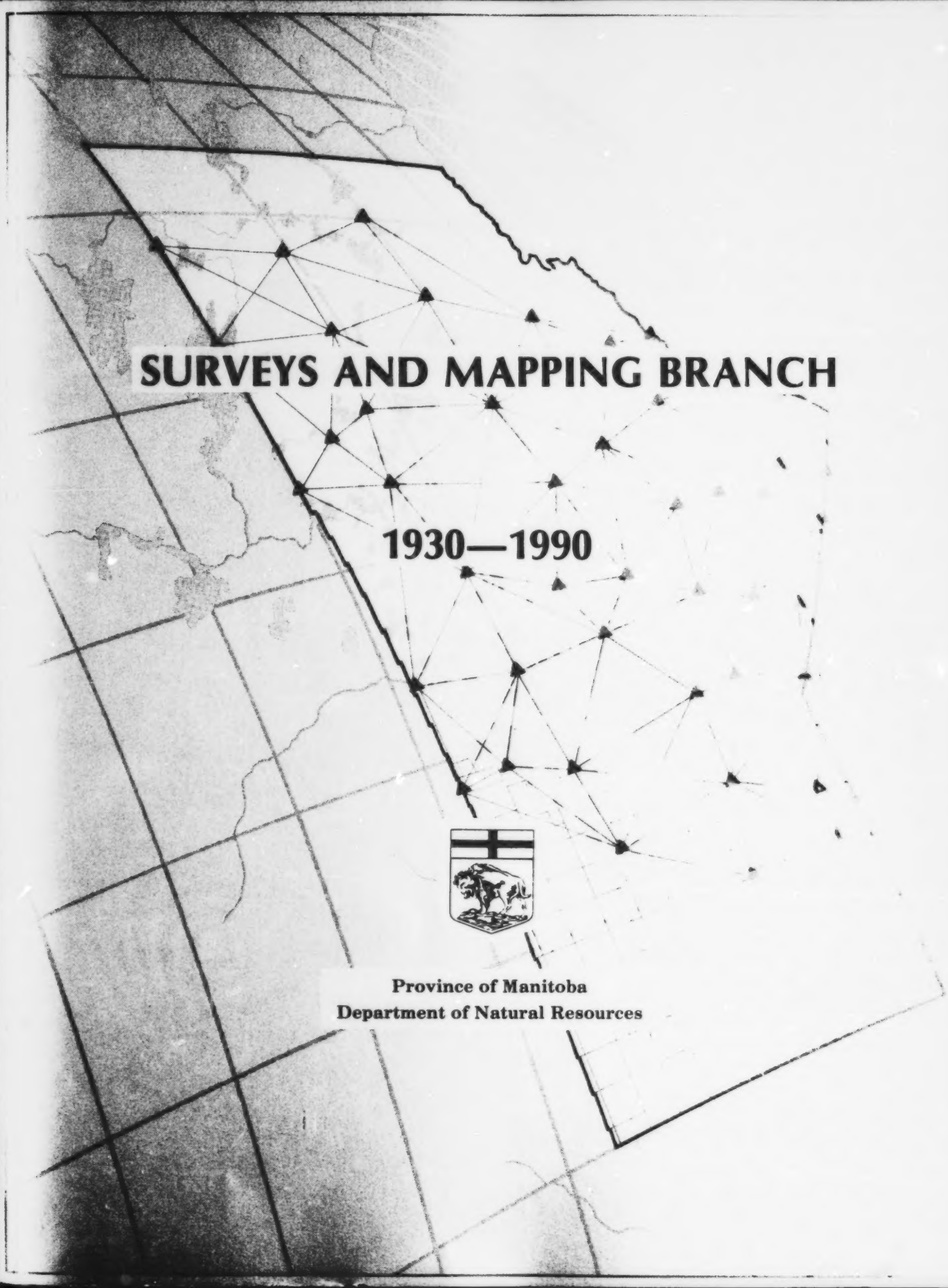


SURVEYS AND MAPPING BRANCH

1930—1990

Province of Manitoba
Department of Natural Resources

SURVEYS AND MAPPING BRANCH
PROVINCE OF MANITOBA

ITS FIRST SIXTY YEARS

1930 — 1990

Winnipeg
July, 1990

91-02081/

DIRECTOR'S MESSAGE

The transfer of natural resources from Canada to Manitoba on July 15th, 1930, also involved the transfer of certain specialized responsibilities, each being an intregal part of these resources. One of these responsibilities was the surveying and mapping of the province, and on October 15th of the same year, the Surveys Branch was established in the Department of Natural Resources.

It was a real challenge for a province the size of Manitoba to assume those responsibilities formerly held by Canada. The agricultural regions were almost all surveyed but only covered with limited mapping and the vast northern regions were virtually void of surveys and mapping. With the exploration and development of the natural resources fast becoming an urgent and vital need, the early staff met the challenge and, under difficult field conditions, established the necessary surveying and mapping systems to support orderly management of provincial resources.

The standards established and the initiatives displayed by those pioneer employees have been passed on to succeeding staff and, together with their ability to adapt to advancing technology, provide a solid foundation for responding to new challenges in the years to come.

We must move forward not only with vigor and imagination, but also with hindsite. In the words of the distinguished Canadian, Northrop Freye, "The rear-view mirror is our only crystal ball - there is no guide to the future except the analogy of the past."

This history record some achievements of the first sixty years and serves as a record of the dedicated people who performed unhealded, but essential, surveying and mapping services.

Special thanks must be given to David Perry and Gerald Holm for their coordination of this project and to the many other current and former employees who assisted in its completion. Each, in their own way, will recognize their contribution which is gratefully acknowledged.

F. W. Leeman

F. Wayne Leeman
Director

Sixty Years

1930-1990

CONTENTS

DIRECTORS MESSAGE	iii
INTRODUCTION — SURVEYING AND MAPPING IN MANITOBA	vii
THE SURVEYS BRANCH — ITS FIRST TEN YEARS	1
THE FORTIES — MARKING TIME	15
THE FIFTIES — BACK TO THE BASICS	22
THE SIXTIES — SURVEYS AND MAPPING ON THE MOVE	40
THE SEVENTIES — EVOLUTION AND EXPANSION	66
THE EIGHTIES — INTO THE FUTURE	95
PAST DIRECTORS — Samuel G. McColl	123
Henry E. Beresford	124
Edward Gauer	125
Allen C. Roberts	126
David W. Crandall	127
STAFFING ORGANIZATION 1979/80	129
STAFFING ORGANIZATION 1989/90	137
STAFF LISTING 1956/90	140
APPENDICIES:	
FIELD SURVEYS 1930 - 1968	143
PRODUCTION TABLES 1968 - 1990	148

INTRODUCTION

SURVEYING AND MAPPING IN MANITOBA

The art of surveying in one form or another is one of the oldest of human activities and extends into the past far beyond the bounds of recorded history.

In all probability the earliest record of a survey was a rude map scratched in the sand or drawn on bark or skin with a piece of charcoal. Primitive though this map must have been, it would yet embody most of the characteristics of a topographic map. Bearings would be indicated by the direction of sunrise or sunset and distances by days of travel.

Later in history when man began to practise agriculture, the property rights of the individual became important. This involved the fixation of land boundaries and the appearance on the scene of the land surveyor. As civilization developed and land became more valuable it was measured and defined with ever increasing accuracy.

The first survey of land in Canada was made in 1625 on the St. Charles River near the City of Quebec and was made by the man recognized as Canada's first surveyor, Samuel de Champlain.

Manitoba's recorded history of discovery also takes us back to the early 1600's when explorers were searching for a 'water route' or 'Northwest Passage' to reach the riches of the far east. Attempts to find such a route through Arctic waters, led explorers such as Hudson, Button, James and Foxe, to penetrate far into Hudson bay.

During the late 1700's and early 1800's a new breed of explorer was developing - the land surveyor. Explorers such as Henry Kelsey and Anthony Henday were sent out by the Hudson's Bay Company to pursuade the Indians to trade with them. Yet with rising competition from the posts established by the French, the Company became very aggressive and employed mappers and surveyors for exploration purposes. In 1778 they brought in Philip Turnor, an English surveyor, who trained David Thompson and Peter Fidler. His maps were the first to give reliable information on the topography of Manitoba.

Peter Fidler was Chief Surveyor for the Hudson's Bay Company from 1796 to 1821. In 1813, he surveyed 24 river lots for Lord Selkirk's Red River Colony, which was the first formal survey on the prairies. The use of the River lot system (land parcels in narrow strips at right angles to the river) was adopted by Lord Selkirk because of his concern for the welfare and protection of the settlers in the isolated colony.

In 1835, George Taylor became the surveyor to the settlement and during his tenure he resurveyed all existing, as well as 1,542 additional lots, the plans

for which became the basis of the Hudson's Bay Company Land Grants in the settlement. By 1860, three surveyors, William Inkster, Roger Goulet and Herbert Sabine, were required to cope with increased development.

The first step in bringing the west into Confederation was the purchase of the Hudson's Bay Company holdings, known as Rupert's land. Prior to the official land transfer, the government undertook to establish a land and water link between the Canadian provinces and the Northwest Territories. Simon Dawson was placed in charge of the work and he sent a survey and road-building party, under John A. Snow, to Fort Garry to begin work at the western terminus of the route (the Dawson Road), portions of which are still in use today. Snow's was the first Dominion survey party to operate in the Red River Settlement.

Lt. Col. John Stoughton Dennis, later the first Surveyor General of Canada, was asked to recommend a land survey system for the Northwest Territories. He travelled overland, stopping in St. Paul, Minnesota to confer with the State's survey officials, thereby gaining an insight into theory and application of the "rectangular land system". From these consultations, he proposed a system with each township being approximately eight miles square, and divided into 64 sections of 800 acres each. The original Hudson's Bay Company river lots were to be resurveyed, but left intact.

Dennis set out in 1869, along with Milner Hart and Major A.C. Webb, to implement this system pending approval from Ottawa. His instructions from the Lieutenant Governor of the Northwest Territories, William McDougall, were to select "the most suitable localities for the survey of townships for immediate settlement". He established the Principal Meridian from a point on the International Boundary ten miles west of Pembina. Hart set about surveying township lines in the Shoal Lake area while Webb worked near St. Norbert, east of the Principal Meridian.

On October 11, 1869, Webb's crew was stopped by a Metis party led by Louis Riel. The Metis were concerned that the government was going ahead with its survey before their titles to Hudson's Bay land grants had been verified. No violence ensued, and the survey party left quietly. All surveys were brought to an end by the Metis uprising later in the year.

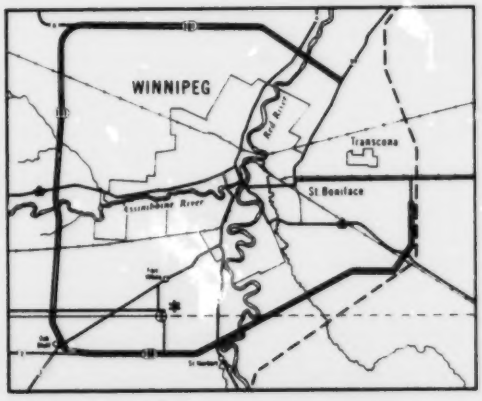
The uprising was ended by force in the early months of 1870, and in May of that year, the transfer of the Northwest Territories to the Dominion finally took place. The new Lieutenant Governor, Hon. Adam G. Archibald (1814-1892), suggested several changes to Dennis' township system. He favoured the rectangular system, but recommended that the smaller township divided into 36 sections of 640 acres be adopted to conform with the United States subdivisions. He felt that the immigrants throughout the world had come to recognize these standard units of land division. This great system extending from Ontario to the Rocky Mountains is today recognized as the simplest and most satisfactory scheme of land identification ever devised by man.

For almost sixty years after the formation of the Province of Manitoba in 1870, the surveying and mapping of its lands were solely administered by the Federal Department of the Interior. During this period, the principal surveying activities included the expansion of the township framework and the subdivisions of townships for settler's homesteads and communities. The mapping of the territories expanded because of necessity for resource development and because of advancement in mapping technology.

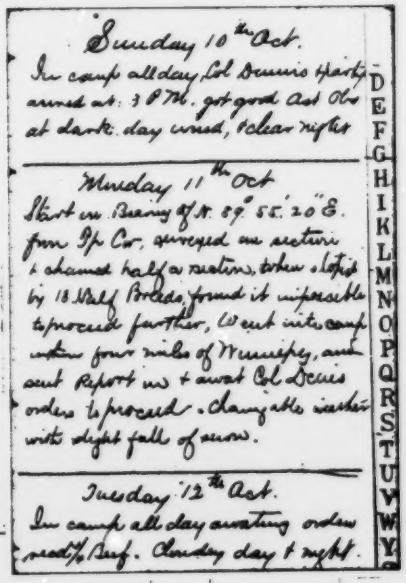
The surveying of the lands paved the way for reliable mapping of the region since information was taken from township survey maps, commonly referred to as township diagrams. They provided topographical detail such as shorelines, marsh areas, roads, trails, railways in relationship to surveyed sectional boundaries. In 1891 the Topographical Surveys Branch introduced a 'Sectional Map Series' which at a scale of 3 miles to 1 inch and later at 6 miles to 1 inch served mapping needs for many years.

There remained the fact that little was known of the unsurveyed Northern 70% of the province. Any existing maps of 'wilderness' areas prepared from exploration survey reports lacked topographical detail and therefore reliability. With the advent of aerial photography in the 1920's it became apparent that in such large areas using some form of geodetic control, topographical detail of an entire region could be filled in from air photos with a speed and accuracy unobtainable from ground surveys. It was inevitable that aviation would play an increasing role in the surveying and mapping of this vast country.

At the time of the transfer of the natural resources to the province in 1930, only about one quarter of the province had been surveyed and less than one half had been mapped.



* *LOUIS RIEL and 17 men stop the survey on Monday Oct. 11th. 1869*



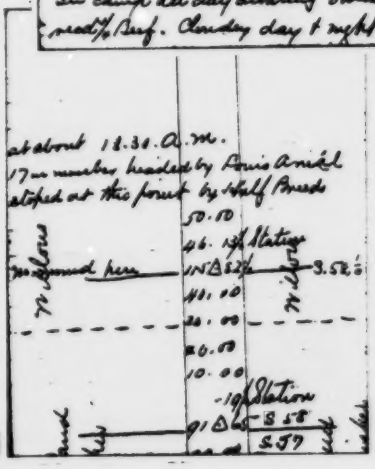
Sunday 10th Oct.
In camp all day, Col Dennis Party arrived at 3 P.M. got good Ast Obs at dark. day cloud, & clear night

Monday 11th Oct
Start on Bearing of N. 89° 55'. 20" E. from Sp Cor. surveyed one section & chained half a section, when left by 18 Half Breeds, found it impossible to proceed further, Went into camp within four miles of Winnipeg, and sent Report in & await Col Dennis orders to proceed. Cloudy all the day with slight falls of snow.

Tuesday 12th Oct.
In camp all day awaiting orders ready for Surv. Cloudy day & night.

D E F G H I K L M N O P Q R S T U W Y

Copy from diary of A.C. Webb, D.L.S. Field Book No. 771



at about 18.30 A.M.
17 in number headed by Louis Riel
stopped at this point by Half Breeds
50.00
46.14 Stations
N 82½ E 3.52.5
41.10
20.00
20.00
10.00
19 Stations
S 58
S 57

Copy from Field Notes of A.C. Webb, D.L.S. Field Book No. 770

THE SURVEYS BRANCH—ITS FIRST TEN YEARS

The following material deals with the establishment, organization, responsibilities, activities and accomplishments of the Surveys Branch during trying economic times

The Surveys Act, passed in 1930 by the Manitoba Legislature made provision for the direction and control of all surveys of Crown Lands. Under the provisions of this Act, a Surveys Branch of the Department of Mines and Natural Resources was organized on October 15, 1930 and became the agency responsible for the continuation of those services in surveying and mapping formerly carried out by the Topographical Survey of Canada, a branch of the Department of the Interior.

1930—SURVEYS BRANCH POLICY—1930
(From the first annual report)

Briefly the policy of the Surveys Branch is to supervise, direct and control all surveys of Provincial Lands, surveys of all Mineral Claims; boundaries of Parks, Forest and Game Reserves, Timber Limits, Townsites and Summer Resorts; Topographic Surveys and levelling operations, land classification and soil surveys, control surveys for mining areas and aerial mapping; retracement, restoration and perpetuation of original surveys, together with the preparation, compilation and keeping up to date all plans and records, the filing, indexing, recording, checking and examining of plans of survey, preparing town planning schemes for Northern Townsites, drawing up descriptions and furnishing areas and other information required for the transfer or lease of Provincial Lands.

S. E. McColl, Director of Surveys, on far left (others unknown) circa 1930

THE FIRST STAFF

Some dated details on staffing to April 30th, 1932 are provided here. For further information see the Staffing Appendix.

October 15th, 1930: S. E. McColl M.L.S., D.L.S., S.L.S., B.A. was appointed Director of Surveys and in November 1930, H. E. Beresford M.L.S., D.L.S., M.E.I.C. became the Chief Inspector of Surveys.

June 30th, 1931: the following each received this message from the Civil Service Commission *Kindly report to Mr. S. McColl, Director of Surveys on Thursday morning, July 2nd for duty.* They were temporarily employed on the Dauphin River survey.

John Newell McLean	Instrument Man
Walter Muir Murray	Instrument Man
William George Campbell	Assistant to Surveyor
Samuel Findley Clark	Level Man
Donald Earnest Denmark	Chief of Party
William Ralph Davis	Field Engineer
Arthur Wallace Walkley	Field Engineer
James Cornelius Neufeld	(Unknown)

July 23rd, 1931: in a letter from S. E. McColl to H. E. Beresford (on holidays at Detroit Lakes) he states—*Mr. Davy, our draughtsman, reported today and seems to be a promising lad and Kelson is reporting on August 1st, so if I can get a hold of my cartographer I will be alright.*

August 14th, 1931: Rene Henry Michael Ledoux was temporarily employed as a stenographer for the Surveys Branch of the Department of Mines and Natural Resources at a rate of $2.50 per day.

April 30th, 1932: A list of permanent staff on payroll:

Beresford, H. E.	Assist. Director of Surveys
Block, Mrs. F. E.	Stenographer
Davy, H. J.	Draughtsman
Henderson, David	Draughtsman
McColl, S. E.	Director of Surveys
Sharpe, D. N.	Surveyor
Taylor, Andrew	Record Clerk

THE FIRST SURVEYS

The fiscal year ending April 30th, 1931 provided no appropriation for field surveys and as control traverse surveys were urgently needed, arrangements were made with the Mines Branch to send two control survey parties into the field in January 1931.

One party with G. E. Webber, M.L.S. in charge conducted surveys in the Central Manitoba (Bissett) area. They completed 48.3 miles of chained traverse mostly through timbered country, 35.6 miles of stadia traverse and planted 81 permanent survey monuments being Manitoba Government Survey posts set in rock with lead and referenced with large stone mounds.

G. E. Webber Mining Control Survey—circa 1931

Members of G. E. Webber Survey Party:

	Position	Rate/ Month	Term of Service
W. Hayward	Assistant	$125	Jan. 5—Mar. 18
Neil Hutchinson	Axeman	60	Jan. 9—Mar. 18
Leslie Walker	Axeman	60	Jan. 9—Mar. 18
W. Leftrook	Chainman	75	Jan. 12—Mar. 18
K. Goldstone	Chainman	75	Jan. 12—Mar. 18
Fred Hill	Cook	90	Jan. 12—Mar. 18
Lynn Smith	Picketman	60	Jan. 12—Mar. 18
A. McDonald	Rodman	60	Jan. 12—Mar. 18
A. McLean	Teamster	45	Jan. 12—Mar. 17

Slab Lake
March 3/31

DEPARTMENT OF MINES & NATURAL RESOURCES
Mar 11 1931
FILE 44-6-5
SURVEYS BRANCH

Mr J. E. McColl,
Director of Surveys.
Winnipeg.

Dear Sir,

We should complete all our survey work by March 15th at the latest. The main line is north of Lily Lake now and we have surveyed little Island Lake, Island Lake and part of the Moose River.

Had to cut a road to get into Slab Lake as the old one was pretty well blocked up. We have about seven miles of the main line to run and Lily Lake, Elm Lake and part of the Wanipigow River to survey. Yours sincerely

Geo. E. Webber

Another party with E. L. Burgess, M.L.S., O.L.S. in charge operated in the Wekusko and Herblet Lake area. Survey party consisted of Robert Donald, Assistant, W. M. Bates, W. Sallows, C. MacDonnell, K. Neilson, I. Mast and N. Kronen (cook). In less than two months they completed 104 miles of chained control traverse and surveyed approximately 284 miles of shoreline and planted 30 permanent monuments in rock.

THE FIRST MAP

The first annual report states on account of the fact that no maps of a useful size were printed showing the entire province, the Branch published a new map of Manitoba on a scale of 25 miles to the inch. This has been utilized as a base map for printing on information relative to other Branches of the Department and a good demand for this map has been noticed.

THE FIRST PLANS

It is noted in the annual report that of the two permanent draughtsmen one was *wholly engaged on the compilation and revision of the sectional mining sheets on which are placed all mineral claims located and surveyed and such other information as may be of use to the prospector and mining engineer.*

The first Director of Survey Plan (#1) was approved November 11th, 1930 for the Granite Rock Mineral Claim surveyed by G. E. Webber—Lot 86, Group 74, Section 15, Township 9, Range 17 East. To give the reader an idea of the number of plans entered—by March 28th, 1932 there were 1890 Director of Survey Plans, most of which were mining claim plans.

THE FIRST REPORT

S. E. McColl,
Director of Surveys

C. H. Attwood, Esq.,
Deputy Minister

Report on Operations for Surveys Branch. *December 31st, 1930.*

I have the honor to submit my report on the operations of the Surveys Branch during the period of October 15th to December 31st, 1930.

The Branch was formed on the former date and the staff comprised Director, Stenographer and Water Power Engineer (part time). Arrangements were immediately made to obtain supplies and equipment, and the tabulation of records received from Ottawa commenced.

On Nov. 1st Mr. H. E. Beresford reported for duty as my Assistant and the examination and filing of mineral claim plans was proceeded with. On Nov. 11th, Mr. T. Forest reported for duty as draftsman on sectional mining sheets and the revision and compilation of these sheets was commenced. On Dec. 4th Mr. Perry was appointed to the Branch as record clerk and the indexing of records from Ottawa was proceeded with. On Dec. 15th Mr. Henderson was appointed as Senior Draftsman.

The work performed by the Branch may be summarized as follows:

Preparing and compiling data and maps for Report on Churchill Townsite. (5 copies made).

30 Mineral Claim plans examined—26 of which have been entered and filed. 5 field books examined.

2 plans of subdivision at Atikameg Lake examined.

1 plan of spurs and ballast pits examined.

106 searches made at Land Titles Office and the same number of legal descriptions drawn up for the Lands Branch.

38 Sectional Mining sheets revised and brought up to date.

6 tracings of sectional Mining sheets made.

2 New Sectional Mining Sheets compiled and drawn.

1 Tracing and 7 white prints colored of Eriksdale Municipality.

2 Plans of Marsh Areas—80 chains to 1 inch compiled.

1 plan of Marsh Area—40 chains to 1 inch incomplete.

1 Plan of Sec. 12-14-9 E. compiled and drawn.

1 Large plan of Atikameg Lake Summer Resort traced.

250 Mineral claim surveys from Ottawa entered in Record Book.

Compilation of Staff Chart almost completed.

Preliminary investigation survey of marsh area South of Lake Manitoba.

Numerous descriptions checked, areas compiled and information given.

From the above it will be seen that a portion of the work performed has been done for the Lands & Mines Branch and as time goes on there is no doubt that work of this nature will increase.

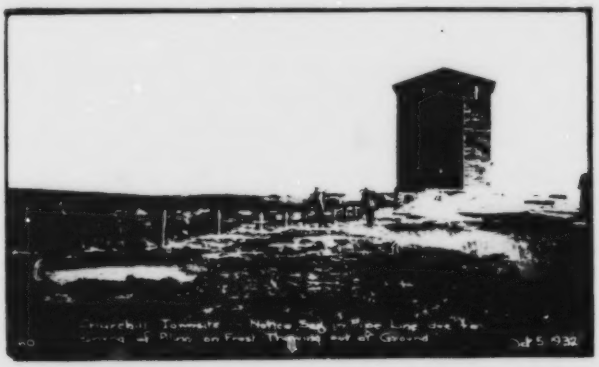
Owing to incompleteness of equipment and staff, progress has necessarily been slow and a great deal of time has been lost owing to the records of the Surveys etc., not having been received from Ottawa.

Respectfully submitted.

Director of Surveys

1931/32

One of the more interesting surveys to which D. N. Sharpe, a staff surveyor and engineer was assigned during this year, was the Dauphin River Power Scheme project. *The branch was entrusted with its investigation and surveys to provide information relating to the diversion of the waters of the Saskatchewan River, the storage that could be obtained in Lakes—Winnipegosis, Manitoba, Cedar and St. Martin, the channel improvements necessary at the outlets of these lakes and the selection of a suitable location for a power site. The information and data secured by the surveys showed that such a development was practicable.*



Churchill Townsite Survey—D. N. Sharpe Surveyor, A. Taylor—Instrumentman

The most important survey of townsites in northern Manitoba was that of Churchill where the problem of the ever frozen subsoil had to be investigated. The area necessary for the initial development of this townsite was drained by constructing a ditch 1,200 feet in length and on this area suitable lots were surveyed during 1932/33.

Also of note was the survey of the International Peace Garden in the Turtle Mountain Forest Reserve.

1932/33

The retracement of the original parish lot surveys of the Parishes of St. Vital and St. Norbert was conducted by Mr. John Reid, D.L.S., M.L.S. By the 1930's very few, if any, of the original wooden survey posts were left in tact. Through a systematic and comprehensive resurvey, evidence of many of them were found and perpetuated with a more permanent type of survey monument. The wooden posts, most extensively used to mark corners, had been burnt or plowed out. In several instances during the surveys trenches had to be dug in order to locate any evidence of the old post location. Inaccurate original plans compounded the problem and invariably made the trenches longer. In a progress report on the surveys of parts of the Parishes of St. Vital, St Norbert and Ste. Agathe dated June 24th, 1933, the following personnel were listed:

John Reid	Winnipeg	Surveyor
A. Baldock	West Kildonan	Assistant
P. Baldock	Middlechurch	Chainman
H. Battram	Winnipeg	Chainman & Picketman

Mr. Reid remained in charge of the Parish Lot retracement surveys until his death in October, 1939.

The decision was made to resurvey a portion of the Manitoba-Ontario Boundary from the Winnipeg River south to the International Boundary with J. W. Pierce, D.L.S., O.L.S., M.L.S. in charge and E. F. Gorman D.L.S. (on loan from Dom. Gov't) assistant. This portion of the boundary had been surveyed in 1897 and the line through the woods had completely grown over. When the line was resurveyed and opened it was found that Ontario game and forestry signs had been placed in Manitoba. The boundary was also the eastern limit of the Whiteshell Forest Reserve which had just been set aside as a Provincial Park and it was essential that the boundary be opened out to prevent trespass in Ontario by Manitoba hunters, fishermen, trappers, prospectors and others.

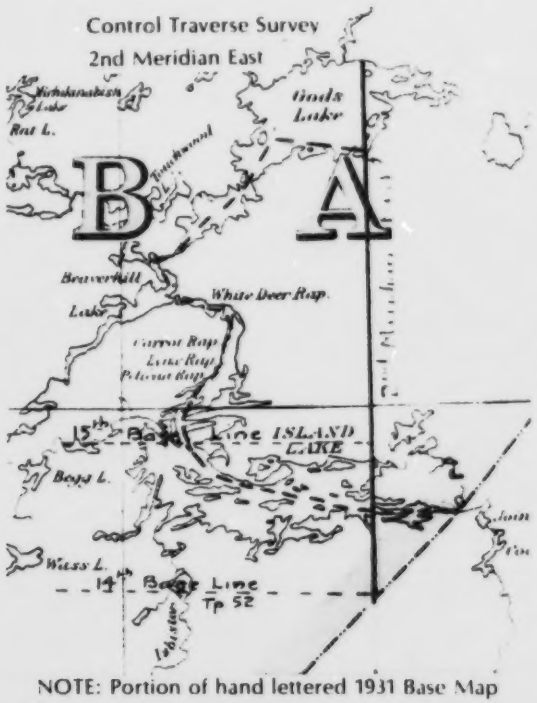
Island Lake Surveys

Leo Ross Charlie McLeod
2nd Meridian East 1932/33

The first major northern surveys undertaken by the new branch were labelled the Island Lake Surveys because of their proximity to that lake. The survey of a portion of the 2nd Meridian East and the chain traverse of Island Lake to Gods Lake (see map) have been allotted additional space to illustrate their planning, costs, staffing, field reports, diaries, equipment supplies and photographs.

NOTE: While reading these accounts one must keep in mind the fact that—except for minor technical and mechanical adaptations—the duration, organization accomodation, and transportation on northern winter surveys remained unchanged until the late 1960's.

During 1932 over 1000 mineral claims were staked in the Island and Gods Lake area with hundreds more anticipated by mid 1933. On December 7th, 1932 the Director, S. E. McColl, recommended to C. H. Attwood his Deputy Minister that control surveys *be made in this area to straighten the matter out and prevent future endless confusion and litigation."* The survey was estimated to cost $12,000.00 and to consist of the production northerly of the second meridian east from its intersection with the Ontario Boundary to the north shore of Gods Lake, and chain traverse from the east end of Island Lake westerly to the west end of Island Lake thence northerly along the Island Lake River to Goose Lake, Beaverhill Lake and northeasterly to Gods Lake closing again on the second meridian east."



NOTE: Portion of hand lettered 1931 Base Map

The survey was approved by the Minister and Mr. H. G. Beresford, M.L.S., D.L.S. was placed in charge. His field surveyors consisted of D. N. Sharpe of the Branch on the 2nd Meridian East survey and G. E. G. Webber, his employee, on the control traverse survey.

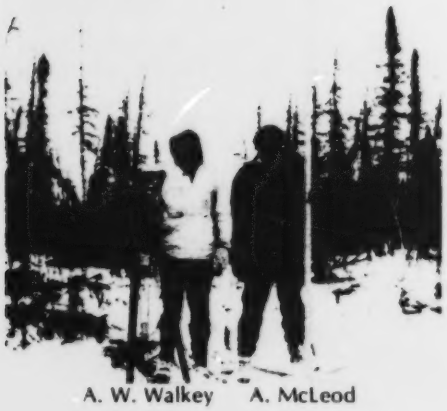
SECOND MERIDIAN EAST SURVEY

Segments from D. N. Sharpe's report:

On December 15th, one man was sent ahead to hire dog teams and axemen at Cross Lake and Norway House. The remainder of the party was organized at Winnipeg and consisted of an Assistant Surveyor, leveller, rodman, two chainmen, transportman, five axemen, four dog drivers with teams and a cook.

E. Gauer

Supplies for 17 men for 90 days were purchased and divided into three caches, designated "D", "E" and "F" and stored at Canadian Airways Base, Lac du Bonnet. Transportation to Island Lake of seven men and the cache "D" supplies was completed between the dates January 3rd and 8th... It was possible to locate our dog trail close to the line; utilizing numerous lakes and water courses, thus cutting down grades and the clearing of obstacles. In a few instances the trail followed the meridian but as a rule this is not satisfactory for when the trail gets cut up the loads are torn by numerous snags...



A. W. Walkey A. McLeod

General—A flu epidemic early in January almost crippled the line cutting and progress was only maintained by utilizing the chainmen, rodmen and leveilers as axemen.

The greatest contributing factor to the successful completion of survey of this kind is always the attitude of each member of the party towards the work they are engaged on. Special mention should be made of the excellent services rendered by E. Gauer, Assistant, Wm. Hayward as transportman and H. Harding Cook. The good humor and resourcefulness of the latter saved the situation on several occasions.

Summary of Costs

Total wages	$4,471.25 (50%)
Canadian Airways—freight	2,346.11 (37%)
Supplies and equipment — (13%)	
Cost of meals per man per day (including freight & supplies)	$1.50 (approx.)
Weights:	
Supplies	7000 lbs.
Hardware and equipment	2000 lbs.
5000 fish for dog feed	14100 lbs.
17 men with dunnage	3875 lbs.

Supplies & Equipment

The following was delivered to D. N. Sharpe, M.L.S. from A. Cole, Maw Block., December 21, 1932.

2	Wash baths
1	Wash board
1	Wash boiler
1	Bread pan with lid
2	Dish pans
2	Cookie sheets
3	Roast pans
3	Fry pans
2	Coffee pots
2	Tea pots
1	Water kettle
8	Water pails
2	Water Dippers (tin)
2	Ladles
2	Mixing spoons
1	Rolling Pin
3	Milk jugs (Enamel)
1	Alarm clock
18	Cups (tin)
1	Roll oilcloth
1	Slicer
2	Skimmers
1	Egg whip
1	Flour sifter
1	Can opener
1	Paring knife
2	Butcher knives
1	Bread knife
20	Dinner knives
20	Dinner forks
20	Teaspoons
20	Desert spoons

6	Large spoons
4	Salt shakers
4	Bread tins
24	Dinner plates
3	Dishups (tin)
12	Dishups (enamel)
5	Dishups lge. (enamel)
1	Large mixing bowl
1	Small mixing bowl
2	Wash basins (enamel)
6	Wash basins (tin)
18	Pie plates (tin)
8	Pie plates (enamel)
20	Soup bowls (enamel)
8	Porridge Bowls (enamel)
20	Cups (enamel)
20	Saucers (enamel)
2	Sugar bowls
8	Sauce pans (tin)
2	Sauce pans (enamel)
1	Grid iron
2	Cake tins
2	Patty tins
1	Bake board
1	Daisy Cook Stove
3	Heaters
6	Snow shovels
1	3 lb. striking hammer
1	Emery grinder
2	Swede saws
4	Blades
1	8 lb. Sledge hammer
1	Extra handle
2	Brush hooks
12	Axes (lge.) and 7 extra handles
2	Axes (sml.) and 1 extra handle
2	Pickets iron section
1	Hand saw
1	Hand hammer
12	1½ iron pipe 4 ft. long
85	Brass posts
2	14×16½×5 tent
1	12×14×6 tent
2	10×12×3 tent
8	Ground Sheets
17	Tump lines
6	pack sacks and 1 silk tent

Received from the Surveys Branch January 3rd/33—
D. N. Sharpe

1	Siderial watch
50′	Tape
300′	Steel tape
200′	Tape
2	1/8" Link tape with tripod, weights, etc.
11	Chaining pins
3	Thermometers
1	Set dies
2	Pickets (Hughes Owens New)
	Level rod (3 sections)
	Weight 20 lbs.
1	Pair field glasses
5	Plumb bobs (chaining)
1	Plumb bob (transit)
	Log tables (Chambers & Bruhn's)
12	Compasses
	Abney level
2	Tension handles
16	Pairs smoked glasses
	Astronomical field tables—nautical almanac
6	Field books
	Pencils
	Rubbers
	Blue chalk
	Correspondence
	Paper—envelopes
2	Receipt books
1	Diary
1	Observation book
1	Magnetic obs. book
1	Cooke level & tripod
1	Arctic robe
1	Cooke transit & tripod
2	Tape grips
	Chain repair outfit
	Camera— (A. Taylor's)
	Film

Comparison of Different Methods of Transportation (from Survey Report)

Wabowden to Island Lake		Gods Lake to Wabowden
Aeroplane	$1930.00	$380.42
Dog teams	2332.00	635.00

2nd Meridian East Survey Crew

Sample of the Payroll (sent to S. E. McColl from D. N. Sharpe Feb.16/33)

	December	January	Rate/Day
Wm. Hayward	19 days	31 days	$3.50
A. Kennedy	2 days	21 days	$3.25
P. Campbell	2 days	28 days	$3.00
E. Gauer	—	29 days	$5.00
A. W. Walkey	—	23 days	$3.25
H. Harding	—	27 days	$3.50
Lewis McLeod	7 days	28 days	$2.00
Albert McLeod	7 days	29 days	$2.00
John Kirkness	5 days	27 days	$2.00
Horace Sinclair	5 days	27 days	$2.00
Jude Swanson	5 days	28 days	$2.00
James Barkman	—	18 days	$2.00

Drivers including dogs and sleds

Jas. McIvor	7 days	30 days	$3.00
T. McIvor	7 days	28 days *	$3.00
Chas. McLeod	7 days	29 days *	$3.00
J. W. Garrick	7 days	23 days	$3.00
Leo Ross	7 days	29 days *	$3.00

* including 3 days dogs did not work.

Portion of D. N. Sharpe Diary

January 3rd: Plane took first load of supplies to Island Lake. Picked up Hayward and McLeod at Hudson Bay Co. Post.

4th: Sharpe, Kennedy, Walkey, Harding left Winnipeg for Lac du Bonnet. Meikle and Mitchell taken to Sagiwitchewan Bay with supplies.

5th: Two loads of supplies taken to Island Lake. S. E. McColl accompanied J. Moir (pilot) to Island Lake and return. H. Harding (cook) went with R. Brown in the other plane.

6th: Snow storm today. Planes did not leave Lac du Bonnet.

7th: Walkey, Campbell, Gauer and Sharpe left for Island Lake. More supplies taken to the lake. Camp moved about 8 miles south of Island Lake, Cache "D".

8th: Clear and cold. Kennedy came with the plane today along with the balance of Cache "D" supplies. Webber and the balance of the second party were brought in the second plane to the Sagiwitchewan Bay. Located the Manitoba Ontario Boundary.
9th:-28° at 6 a.m. Clear and cold. Commenced the meridian cutting. Found the monuments 276 and 277 on the Ontario Manitoba Boundary in good shape. Radio reception good.
10th: -12° at 7:30 a.m. Cloudy all day. Checked chainage on the boundary. The first observation obtained tonight. Instruments giving a lot of trouble owing to excessive cold.
11th: -20° at 7:30 a.m. -18° at 6 p.m. Cold and cloudy all day. Line cutting progressing satisfactorily. Obtained more observations tonight.
12th: -34° at 6:30 a.m. -20° at 8:30 p.m. Clear and cold all day. Cut one mile of line. Unable to get the level in working order.More observations.
13th: -36° at 7 a.m. 8° above at 8 p.m. Used the base line transit and established two miles of line. Mounding commenced. Level working satisfactorily.

February 8th: -38° at 6 a.m. -28° at noon. -23° at 7:30 p.m. Strong Northwest wind all day. Very disagreeable for traversing. Sinclair sent out to Ventures Camp and doctor reports that he is threatened with pneumonia. Sinclair has been ill several days.
15th: -23° at 6 a.m. 0° at noon -26° at 10p.m. Clear and cold. Moved camp to Twp. 57. Sent C. McCleod with J. W. Garrick to Ventures Camp. Garrick has been off work for several days and does not appear to be ready for work. He complains that he is too ill to work. Received a radio message from Mr. Beresford.

March 1st: 3° at 6:30 a.m. 8° at 9p.m. Cloudy most of the day clear sky in the morning. Pilot Stull arrived in the afternoon with a load of supplies. Mr. H. G. Beresford paid us a visit. D. N. Sharpe and Robertson traversing.
26th: 2° at 6:00 a.m. 5° at 6:00 p.m. Snowing a little in the morning. Dog teams left for Norway House and Cross Lake. Party cutting line. D. N. Sharpe located Webber's Traverse Post No. 58.
29th: 28° at 6:00 a.m. 38° at noon 42° at 7:30 p.m. Light rain and sleet in the morning. Cloudy all day. Trails in bad condition. Mounders have a 9 mile walk to start work. Leveller and rodman went back 12 miles to transfer Bench mark elevations. Check chaining well advanced.

April 1st: 32° at 6:00 a.m. 42° at noon 16° at 8:00 p.m. Rain in early morning. Blizzard commenced about 3:00 p.m. Strong Northeast wind. Built the concrete pier at M.41. Webber left for the Jowsey Camp this morning. Hayward and Robertson traversing Gods Lake. Gauer checking observations.
5th: Left for The Pas at 7:30 a.m. Arrived at The Pas at 3:30 p.m. Entrained for Winnipeg at 7:20 p.m.

NOTE: This diary made mention of the following six pilots who at one time or another served or visited this survey: Roy Brown, Ted Stull, Val Patriarche, Jack Moar, M. E. Ashton and F. P. Baragar.

CONTROL TRAVERSE SURVEY

Members of survey party

		Wages/day
G. E. Webber	Surveyor	—
Ross Meikle	Assistant	3.25
W. Leftrook	Chainman	2.75
L. Smith	Chainman	2.25
George Dawson	Cook	2.50
W. C. Mitchell	Water Power Engineer	3.00
Alex Gunn	These men made up the	
J. J. Menow	balance of the party:	
Richard Ross	Axeman	2.00
Joseph Harper	Picketman	2.00
George Brown	3 dog teams @ 3.00	9.00

Correspondance on file includes monthly reports to S. E. McColl from G. E. Webber and excerpts are provided here for interest and record.

January 26/33
.....I am giving the dogs two days holiday here as they have very sore feet and have been working hard every day since January 9th....up to last night we have worked steadily for 17 days and have run 55 miles of traverse and 6 miles of offsets to rock posts.... From information I can get we are not going to make good time on Island Lake River.My picketman ran into slush at the first narrows north of here today. However I'm leaving that particular worry until we get up there. My drivers are still barking like dogs. One of them told me confidentially that he didn't think he'd get better so I guess we'll shoot him....Tonight a dog team came in from Sharpe asking for more food so am sending all spare food from Cache B. We'll be starving pretty soon now at this rate....

Letter (Not dated—probably February 26th,1933)

We finished this survey today except for an azimuth observation.....Have not seen a plane since January 10th.... I am up in air here and don't know what to do. Sharpe asked me to see him and I heard yesterday from a game warden that he is only in township 56 which would make him over 50 miles from here. I will try and get a fast team at Gods Narrows and get to him by way of Island Lake and the Red Sucker Lake trail a trip of about 90 miles....

CONTROL TRAVERSE SURVEY (cont'd)

Supplies to be packed separately for three caches and marked No's. A, B and C.
NOTE: Cache D, E and F used for D. N. Sharpe party

QUANTITY	DESCRIPTION	CACHES A	B	C
70 lbs.	Rolled oats	14	28	28
25 lbs.	Corn meal	5	10	10
40 lbs.	Rice	10	15	15
10 lbs.	Barley	3	6	2
20 lbs.	Split peas	5	5	10
100 lbs.	Beans	20	40	40
40 lbs.	Macaroni	10	15	15
4 lbs.	Cornstarch	1	2	1
300 lbs.	Granulated sugar	100	100	100
20 lbs.	Yellow sugar	5	10	5
25 lbs.	Tea	5	10	10
30 lbs.	Coffee	6	12	12
130 lbs.	Butter	30	50	50
75 lbs.	Canadian cheese	15	30	30
50 lbs.	Kraft cheese	10	20	20
60 lbs.	Drimilk	20	20	20
40 lbs.	Jam	10	15	15
20 lbs.	Marmalade	5	10	5
20 lbs.	Corn syrup	5	10	5
5 lbs.	Molasses	2	2	1
12 oz.	Mapline	4	4	4
30 lbs.	Dried peaches	15		15
25 lbs.	Prunes		25	
20 lbs.	Figs (dried)	10	10	
25 lbs.	Pears (dried)			25
5 lbs.	Currants		5	
15 lbs.	Raisins	5	5	5
50 lbs.	Dessicated potatoes	10	20	20
10 lbs.	Dried soups	2	4	4
10 lbs.	Dried onions	2	4	4
14 lbs.	Baking powder	4	5	5
20 lbs.	Salt	4	8	8
1 lbs.	Pepper	1		
20 Boxes	Royal Yeast	4	8	8
4 lbs.	Baking soda	1	2	1
1½ doz.	Bird's Egg Powder	½	½	½
2 lbs.	Mixed peel	2		
2 doz.	Custard powder	½	1	½
2 doz.	Knox'sGelatine	½	1	½
2 doz.	Jelly powder	½	1	½
1 lb.	Nutmeg	1		
30 oz.	Extracts	6	12	12
2 lbs.	Mustard	2		
1 lb.	Cinnamon	1		
1 lb.	Ginger	1		
15 bars	Washing soap	5	5	5
15 bars	Toilet soap	5	5	5
12 cartons	Matches	3	5	4
3 tins	Dutch Cleanser	1	1	1
6 yds.	Oilcloth	6		
10 yds.	Red Cotton	10		
50 feet	Clothes line	50		
5 boxes	Candles	1	2	2
10 yds.	kitchen toweling	10		
250 lbs.	Fresh beef (boned)	50	100	100
150 lbs.	Fresh pork	30	60	60
150 lbs.	Sausage	30	60	60
150 lbs.	Swift's Premium Bacon	30	60	60
10 lbs.	Long Clear Bacon	2	4	4
50 lbs.	Lard	10	20	20
20 lbs.	Smoking tobacco	4	8	8
5 lbs.	Chewing tobacco	1	2	2
1 box	Zig Zag papers	1		
5 lbs.	Chocolate (unsweetened)	1	2	2
40 Loaves	Bread (unwrapped)	40		
1 lbs.	Cloves	1		

1933/34

In addition to retracement of parish lots and new surveys including public shooting grounds, game preserves and forest reserve boundaries, considerable attention was being directed towards muskrat farming in the marsh areas of the province and subsequent reconnaissance surveys were carried out.

A new map of Manitoba (south of Township 57) was printed at a scale of 8 miles to 1 inch and was used as a base to overprint municipalities, highways and secondary roads and provincial electoral districts.

1934/35

The annual report noted—*an aerial perspective map of Manitoba showing present and future hydro development in relation to mining areas was printed on zinc mined at Flin Flon—a new innovation.* Also a new edition of the Map of Manitoba at a scale of 25 miles to 1 inch was printed.

The extended survey of the Second Meridian East and the survey of the Eighteenth Base Line by D. N. Sharpe was the major survey of the year. This survey was discussed in a letter from S. E. McColl to C. H. Attwood, Deputy Minister dated April 17th, 1935, portions of which are:

On December 26, 1934 the production of the Meridian was continued from this point North to the 18th base-line (Township 68). The line was produced across Gods Lake in temperatures of 46 degrees below zero. One night was spent in a temporary camp on an Island with practically no shelter, and most members of the party suffered severe frost bite. On January 7th, the 18th base-line was reached and the survey of this line Easterly was commenced. The work was vigorously carried on until, on March 13th, the theoretic position of the Manitoba-Ontario Boundary was reached, and a portion of the boundary opened up as a guide to aeroplane pilots and prospectors....

The party was in charge of Mr. D. N. Sharpe, D. & M.L.S., M.E.I.C., a member of the staff of the Surveys Branch, acting under instructions of Mr. S. E. McColl, Director of Surveys. Mr. E. Gauer, M.L.S. acted as Chief Assistant, and with the following experienced members of former Dominion and Provincial Survey parties, was largely responsible for the successful completion and fine record established in this survey.

Wm. Hayward, A. W. Walkey, Percy Campbell, Angus Kennedy, Charles Johnstone, Bruce Vermilvea, Harry Harding, the genial and efficient cook.

The following news article taken from the Branch historical data file (writer unknown) was based entirely on this survey:

Modern Explorers

On the morning of December 23, 1934, while most of us were in the rush of Christmas preparations and filled with thoughts of roast turkey and plum pudding, eight parka-clad men climbed into two big planes at Stevenson Field. There was a spirit of enforced gaiety among them, an obvious effort at cheerfulness, as each thought of the festive season he was to leave behind. The motors of the big machines coughed and sputtered, then settled into a steady reassuring drone. The pilots climbed to the controls, glanced back at their cargo, opened the throttle and taxied out into the wind.

The planes circled the field once, then settled quickly to a course leading North North East. The patchwork pattern of white and green, as frozen lake and spruce and pine passed quickly underneath, formed a minor key in tune with the thoughts of those aboard the big transport planes.

Thoughts of home vanished, momentarily, as each gasped at the astonishing beauty of Island Lake from the air. "Three thousand specks of green against a blanket of white. Three thousand shapes so different yet each alike...."

"Modern Transportation"—A Junkers on small lake on Base Line

Another hour flying and the planes glided down upon Gods Lake. The men emerged and after them came instruments and supplies.

This was the jumping-off place, the starting point of a base line to be produced across the unknown, unmapped territory East of Gods Lake by officers of the Surveys Branch of the Manitoba Department of Mines and Natural Resources.

Following very closely upon the publication of maps and geological reports of the Gods Lake Area, prospectors had made the rich discoveries which are now being developed by Gods Lake Gold Mines Limited and other mining companies. Encouraged by the richness and size of this ore-body, prospectors attempted to push eastward toward the Ontario boundary. Travel in this unmapped region with its maze of waterways and constantly recurring rapids and falls was next to impossible.

Frequent requests for information resulted in the decision to publish maps. This work is being undertaken by the Topographic Surveys Branch at Ottawa in co-operation with the Surveys Branch of the Provincial Government.

The ground control for these maps, comprising the base line mentioned above was the immediate concern of the Provincial Branch, and still more the concern of the men who were to eat bacon and beans in lieu of roast turkey on Christmas Day, 1934.

At Gods Lake the party was organized. The eight technical men who had flown in from Winnipeg were joined by native axemen, labourers and dog drivers. The bulk of the supplies which had been shipped by rail to Ilford, thence by plane to Gods Lake, were unpacked and sorted. The complete outfit was given a final checking and the party made ready to start the 100 mile push which was to end at a point, determined by precise calculations as that at which the Manitoba-Ontario boundary will, when surveyed, intersect the 18th Base line.

The first day "on line", always a trying one, was in this case particularly arduous. Fourteen miles on snowshoes across a wind swept lake in forty-five below zero weather; on feet unaccustomed to the extra weight and binding thongs; sandwiches which ranged from smoking toast on the outside to frozen bacon in the centre; the continuous burden of unaccustomed clothes; the blinding glare of sun on snow; the ache of muscles long unused.

Gradually the men "toughened up". Each day accomplished more than the one before with fewer aches and pains as ease replaced awkwardness and the organization became better knit.

Moves were frequent and when the terrain was sufficiently open, a short wave radio message called a plane to the party's assistance. Men and equipment then sped lightly over what the day before had been a long hard hike. When there were no landing places the equipment was moved ahead by dog team. Throughout the work, four dog teams were kept busy moving supplies along the line. Significant amongst these supplies was 7 tons of fish for the dogs.

Dog Teams used during the 18th Base Line Survey

For 106 days without a break each man continued to press forward his particular phase of the work. The Chief, Mr. D.N. Sharpe (who by the way is privileged to write the following letters after his name: B.A.Sc., D.L.S., M.L.S., M.E.I.C., A.P.E.M.) was responsible for the co-ordination of the various parts of the work, line cutting, chaining, mounding, leveling, traversing, transport, commissariat, transit work, and the endless computations. Daily reports from his half dozen lieutenants kept him constantly appraised of the progress

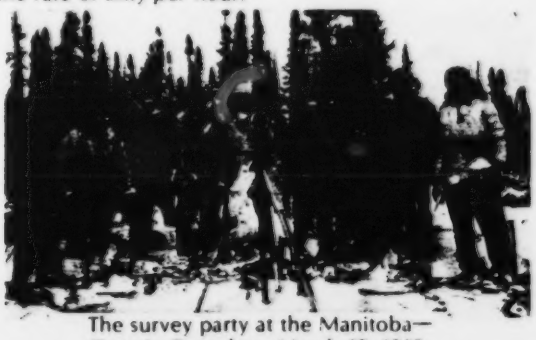
of each department. To maintain proper balance, men were transferred from the advanced to the lagging in a constant effort to keep all work within easy distance of the spear head of the line. Long after the early night had fallen and five tents had blended their grayish whites with the background of spruce and snow, distinguishable only by the white smoke column ascending from each toward the blaze of glory overhead, the sixth tent stood out in sharp contrast as a row of candles illuminated pages of notes and pads of calculations.

Camp # 11 on Base Line

In the early evenings (and sometimes late) the assistant, Mr. E. Gauer B.Sc. (C.E.), M.L.S., kept his lonely vigil with the stars. From computations previously prepared, the big transit was set pointing heavenward. With a flashlight focussed on a special sidereal watch the observer would await anxiously for the appointed time, then experience that never ending thrill when, upon peering through the telescope he would see that single spot of light move quickly across the glass to hide itself for a split second behind the centre hair. The sidereal time of that instant is all important. From this factor and several angular readings the surveyor is able to deduce the direction of his line within two seconds of arc. But let him explain just what this means. "One second of arc is one/one million two hundred and ninty-six thousandths of the angular distance around a circle. This means that in place of a compass of 16 or 32 points, we, by use of the stars, divide our compass effectively into 648 000 points." No wonder there is a thrill in finding that this seemingly impossible degree of accuracy has been maintained!

Harry Harding, the genial host of the cook tent, is a character worthy of more than passing mention. Suffice it to say, however, that his keen sense of humour, his deep baritone voice, and his knowledge of music, in addition to his culinary artistry combined to make him a most popular member of the party. During many of the long evenings, as men stretched full length in their eiderdowns, the lilt of an old song issued forth from the cook tent to banish thoughts of hardship and fatigue; to provide a course down which tired minds could wander pleasantly to happy thoughts of home. Many years in rough camps, in intimate contact with interesting characters of out-of-the-way places had provided Harry with a fund of interesting and humerous anecdotes, which at meal times were welcome relief from thoughts of work. As a mimic Harry was in his glory and many men, well-known to members of the party were paraded in caricature to the hilarious amusement of all assembled. From a culinary standpoint Harry is an acknowledged artist. In the bigger camps of more prosperous days he, with one assistant, turned out the most delectable pies at the rate of sixty per hour.

Looking West from B 15 (Monument)



The survey party at the Manitoba—Ontario Boundary, March 19, 1935

By Thursday noon, April 11, the work on the line was completed. About 10:30 that same evening the technical staff of the base line party were comfortably seated in their own homes, six weeks distant by earlier modes of travel from the field of their recent operations. From wilderness and frozen lake to the comfort and luxury of a city dwelling in no more than from noon to night! The luxury of a hot bath and a soft sweet-smelling bed - almost unbelievable!

From strange lands come strange stories—stories of hot springs and unfreezing rivers, of primeval monsters scattering the landscape with the bones of their victims. Into this country the natives followed the white man with more than trepidation, only to find the rivers solidly frozen and perhaps a high ridge assuming the form of an ancient dinosaur.

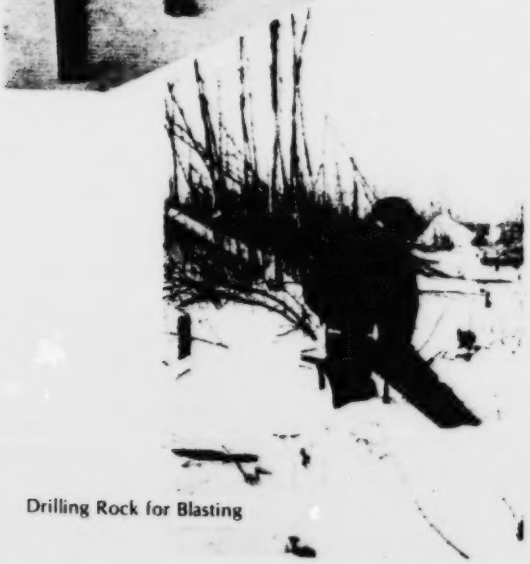
Shovelling runway for Junkers airplane

And when a few months hence, you read a brief account on the fourth page of your daily paper to the effect that a map of the area East of Gods Lake has been published and is available at the Surveys Branch, just bear in mind that this is welcome news to the prospector. To him it means that the waterways are charted, the muskegs

shown, the falls and rapids clearly marked and that a route from point to point may be readily determined. To him it also means that the first step toward the adequate geological mapping of the area is now complete, that the road into the Flin Flons and San Antonios of tomorrow is at last made passable.

To those men who ran the 18th Base Line, this news item will stimulate a torrent of memory, pictures of hardships and pleasantries, of long hard hikes and later the swift traverse of the same ground by plane. To each will come again the realization that he, with his superiors was able so successfully to co-ordinate the advantages of the aeroplane and the radio with those of the dog team and the Indian runner as to bring the cost per mile somewhere between 25 and 50 per cent lower than experienced upon any similar undertaking. To each man we offer our congratulations, knowing that this is of little account when compared to what is already his - the solid satisfaction of a tough job well done.

Typical Base Line Pack??



Drilling Rock for Blasting

Winnipeg Tribune—April 22, 1935

TERRITORY EAST OF GODS LAKE NOW SURVEYED

Headed by D. N. Sharpe, of the natural resources branch, a survey party returned to the city today after spending five months in the extreme corner of northeast Manitoba, in the district east of Gods Lake to the Ontario boundary.

The party ran base and meridian lines through previously uncharted territory that this year will be open to prospectors. Claims may now be registered with reasonable accuracy in the mining record office.

The party left Winnipeg by aeroplane early last December. Scarcely an hour was lost in the whole five months. They were constantly in touch with Gods Lake by radio and their camp equipment was for the most part moved by aeroplane when they were ready to make a new location.

Records of their survey work will be published in a map as soon as their reports are completed to the surveys branch.

The government, anticipating heavy development in the district this year, ordered the survey last fall.

Tribune Ap 22 35

D.N. Sharpe, M.L.S. Clad in Winter Clothing

1935/36

The extension of the 18th Base Line (Township 68) from the Principal Meridian to the 2nd Meridian East commenced December 23rd, 1935 with the following technical crew:

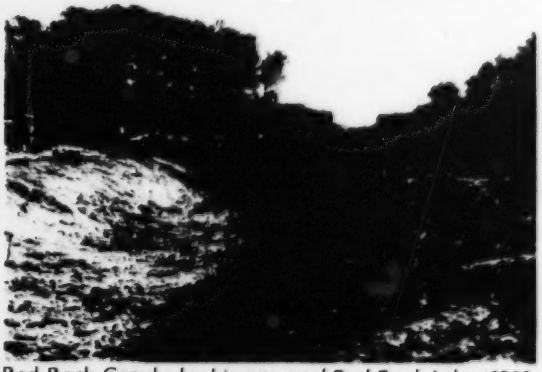
Surveyor—D. N. Sharpe, M.L.S., D.L.S.
Assistant & Observer—A. Taylor, M.L.S., D.L.S.
Chain Stadia Traverses—C. R. Chataway, M.L.S.
Chainmen—Angus J. Kennedy, Charles W. Johnstone and J. S. Brook, (substituted for Johnstone).
Leveller—E. Magill, Rodman—T. Bruce Vermilyea

Angus Kennedy C. R. Chataway

Harry Harding—an excellent cook and humorist

During 1935 D. E. Denmark, M.L.S., D.L.S., conducted the preliminary surveys and engineering investigations in the Marsh Area east of The Pas—the forerunner of the highly successful Muskrat Rehabilitiation Project between the Saskatchewan and Summerberry Rivers. The branch supervised the construction of dams, dykes and canals undertaken as a joint Dominion-Provincial Relief project to bring back to residents in and near The Pas a means of livelihood and a better mode of living.

Dumping loaded scraper—return pully tripod in background



Red Rock Canal—looking toward Red Rock Lake (1936) Excavation by power drag scraper—canal 20' bottom 8' to 2' deep

1936/37

Manitoba-Saskatchewan Boundary Survey

The Manitoba-Saskatchewan Boundary Commission was established on June 10th, 1936 with F. H. Peters (chairman), Surveyor General of Dominion Lands, S. E. McColl, Director of Surveys (Manitoba) and M. B. Weekes, Comptroller of Surveys (Saskatchewan). The first survey of the boundary in the vicinity of Flin Flon was conducted by R. A. McLellan, D.L.S., M.L.S., S.L.S. between August 2nd, and November 10th, 1936.

The plant of Hudson Bay Mining and Smelting Company was astride the boundary and the purpose of this survey was to define the exact position of the boundary for the proper administration of the law and mining rights.

It entailed the survey of over 40 miles of line between the 17th and 18th base lines and the retracement of 25 miles along the 29th/30th range line. A total of 3.6 miles of actual boundary along the centre of the road allowance was marked by 7 concrete piers.

Manitoba-Ontario Boundary Survey

Noted on Photo Reverse—*Camp #8 on point in Stull Lake, Mile 60. Before the line had reached this camp five cans of tobacco and three pairs of moccasins had been wagered that the camp was in Manitoba or in Ontario. When the office tent had to be lowered and the line passed over the corner of the cookery, the bets were called off.*

The Manitoba-Ontario boundary was surveyed from the east end of Island Lake northeasterly to Echoing River (114 miles) by J. W. Pierce, assisted by E. Gauer. The Annual Report stated—*The survey was made during the winter and for the first time on record the sole means of transportation used was the aeroplane..... By using aeroplanes for transportation, it was again demonstrated that the work was done quicker and at considerably less cost than by using the former methods, viz.—canoes in summer and dogs in winter.*

Back in The Office:

As an indication of the branch secretarial work, it was noted in the annual report that 3100 communications were dealt with in branch correspondence, comprising of requests for maps, plans and legal descriptions, enquiries regarding surveys and correspondance with surveyors in the field.

This photo appeared in D. N. Sharpe's report report on the Survey of Islands in Lake Manitoba Twp. 21, 22 Range 8 to 10 W.P.M. The caption reads: *On Trail west of Eriksdale—the cutter was constructed from the chassis of a Model "T" Ford and accommodated three men with the survey equipment, quite comfortably.* (The team and cutter were hired for the thirty mile trip from Eriksdale to Goose Island on March 5th, 1937).

1937/38

Portions of the 6th and 7th Base Lines East of the Principal Meridian and meridian lines connecting these bases were surveyed.

It is interesting to note the work done on the development of the marsh area east of The Pas—10 canals, 18 earth fill dykes, 4 control dams and 4 patrol cabins were constructed.

The problem of dealing with dried up water areas in the settled portion of the province became urgent. Disputes over accrued areas were occuring and surveys were made to properly define the areas.

1938/39

Some members of the 20th Base Line Survey Crew:
1. Arne Pearson, 2. Jack Inkster, 3, Pilot, 4. ?, 5. Frank Richot, 6. T. Bruce Vermilyea, 7. Max Grant, Other members not shown—E. Gauer, Surveyor-in-charge, J. W. McClure, radio operator, and H. A. Fuller, observer. (Jan. 27th—April 7th, 1939)

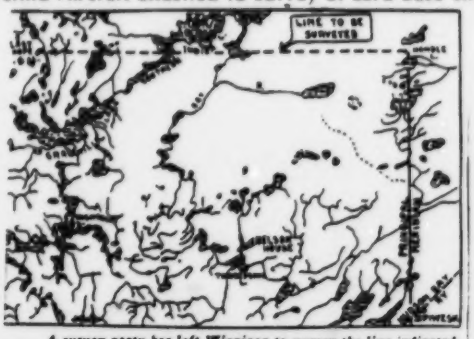
The Second Meridian East was surveyed for 22 miles to its intersection with the 20th Base Line which was then run east for 79 miles.

Map production for the year included a map for the Public Works Department in connection with the Royal visit, a map for "The Whiteshell" tourist publication and the revision of the Branch's Map of Manitoba to a scale of 20 miles to 1 inch.

1939/40

23rd Base Line Survey

Fairchild Aircraft attached to Survey of 23rd Base Line



A survey party has left Winnipeg to survey the line indicated on this map of hitherto uncharted territory, 500 miles north of Winnipeg. Northeast of the Flin Flon area, the district has promising mineral deposits.

Survey Party Will Run Base Line In Far North

Mapping Of Promising Mineral Area Will Follow Running Of New Line

EQUIPPED with transits, levels and radio, a survey party left Tuesday to run base lines through a hitherto uncharted country 500 miles straight north of Winnipeg, north of the 56th parallel.

The party, headed by Edward Gauer, has been assigned by Hon. J. S. McDiarmid, minister of natural resources, to run what is termed the province's 23rd base line. Part of it left by aeroplane from Lac du Bonnet and part by railway from Winnipeg to The Pas, to travel thence by the Hudson Bay railway to Thicket Portage, which has been chosen as the supply base.

Prospectors who have been in the country on their own and staked out promising gold claims around Last Hope Lake, prompted the department to make the survey.

Travel by Plane

The party will start from the tip of the principal meridian, the survey of which was started in 1860 and in after years run as far north as Township 88, to a point near Handle Lake.

Through northern wilderness the base line will be carried to the Saskatchewan boundary, nearly 200 miles. More than 100 miles of the district has not been mapped.

The line will provide a ground control for subsequent air mapping of the district by the Royal Canadian Air force.

The Winnipeg Tribune, January 10, 1940

In order to properly map 400 new mining claims in the Granville Lake area it was decided to survey the 23rd Base Line west from the Principal Meridian for 140 miles. It was the first time in the history of surveying in Canada that an aircraft was "attached" to the survey party. The plane and crew were supplied by the Air Service Branch of the Department.

A summary of the air transportation required:
130 hours, 40 minutes flown; 334 landings; 13,530 miles; 433 passengers carried; 24,730 passenger miles, and 161,200 lbs. of freight carried.

A photographer F. G. S. Holmes was attached to the party for a few weeks and he produced a "silent" colored 16mm film entitled "Mapping Manitoba". (A copy of this film is in the branch records).

Each man puts up his own lunch at breakfast time and carries it tied to his belt. Lunch consists of meat or cheese sandwiches, pie or cake, and is generally frozen solid by lunch time. Lunch is thawed out and tea is made with the melted snow. (from the text for the film "Mapping Manitoba").

A Tribute to J. Reid and S. E. McColl

The Branch mourned the loss, by death, of two outstanding staff surveyors during the year, John Reid, 60 (October 3rd, 1939) and Samuel E. McColl, 54 (January 26th, 1940).

Mr Reid had been conducting the parish lot retracement surveys in the vicinity of Winnipeg since 1932.

In his tribute to S. E. McColl, Director of Surveys, The Minister, J. S. McDairmid stated— *From a small beginning Mr. McColl brought the Surveys Branch to a high state of efficiency and usefulness.....*

From a 10th anniversary article:
....At this first important milestone in its history the Branch can look back with pride at its accomplishments.

THE FORTIES—MARKING TIME

The policy of restricted expenditures during the depression continued through the war years, after which resource development spearheaded the need for both surveying and mapping. Postwar activities were confined to projects which were part of the Department's reconversion plan and necessitated closer co-operation with the other branches.

1940/41

Connolly Lake Fur Rehabitation Project

Crew Returning to The Pas in the Spring

74-3/40

E. Gauer (without hat) and his Fur Rehabilitation Investigation Survey Crew

Investigation surveys for the Fisher River and Connolly Lake Fur Rehabilitation projects, surveys of dam sites on the La Salle, Pembina and Souris Rivers, and surveys of R.C.A.F. bombing fields were among the projects for 1940/41. Office work included the production of maps of the Fisher River Fur Rehabilitation Project, Duck Mountain Forest Reserve and the Whiteshell Provincial Park.

1941/42

A portion of the Manitoba-Saskatchewan boundary between the 11th and 12th Base Lines was surveyed to facilitate timber operations in the Porcupine Forest Reserve. The survey was made by F. C. Lamb, D.L.S., S.L.S. and assisted by E. Gauer, D.L.S., M.L.S., during the period, August 18th to October 11th, 1941.

Inspection of the last mound on the Manitoba-Saskatchewan Boundary Survey by Commissioners D. A. Smith (in suit) and H. E. Beresford (behind transit), D. C. Lamb (behind mound) and E. Gauer (without hat). The balance of the crew included five Axemen—A. Robillard, D. Van Ness Jr., C. Erickson, Erick Solbrakken, Ivan Mellon; Chainman—G. Duncan Black; Teamster—A. Van Ness and Cook—R. J. McEvoy.

Construction of cabin at mouth of Thickwood Creek

Maps of the Whiteshell Provincial Park and the City of Winnipeg were revised for preparation of folders for the Travel and Publicity Bureau.

1942/43

The Fisher River Fur Rehabilitation Project received attention with additional level surveys and the construction of two dams and some buildings under the supervision of W. Hayward.

Fur Rehabilitation Project—Jackhead River Dam

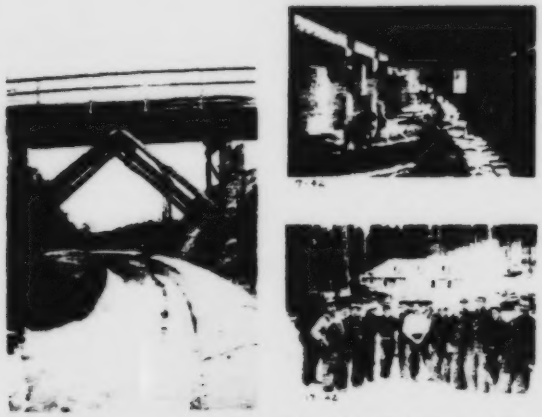
View looking upstream showing both cofferdams. Site pumped dry in 3½ hours with hand operated diaphram pump.

Labourer with wooden mallot used to drive sheet piling.

Commencement of construction.

Within the Whiteshell Provincial Park a survey of a road, sport fish hatchery site and some lots were made for the purpose of obtaining title. Also surveyed were 37 miles of the main scenic road along the south shore of the Winnipeg River to Seven Sisters Falls.

A map of North America and a map of the Northern Hemisphere showing the great circle routes passing through Winnipeg were compiled.



Construction of bridge and fish hatchery at West Hawk Lake

1943/44

Surveys were carried out in the Whiteshell Provincial Park for post-war development and in four communities for town planning programs.

A geological map of Snow Lake/Herb Lake area and several maps related to fur rehabilitation projects were compiled.

1944/45

Post-war Survey Projects

Post-war projects were given a high priority and they included: Topographic and level surveys for fur projects in Netley and Delta Marshes, preliminary surveys at Meadow Portage to appraise the possibilities of controlling the level of Lake Winnipegosis and utilizing the head for power development, township subdivision for veteran land settlement, investigation surveys of lakes for fur and tourist development purposes in the Duck Mountain Forest Reserve, surveys of 107 additional summer resort sites in the Whiteshell Provincial Park.

Delta Marsh Survey—1944/45

Maps and Mapping

For the first time since the beginning of war the R.C.A.F. released aerial photography equipped planes for non-military work in Manitoba. Photos taken of an area east of Flin Flon, where active prospecting was taking place, were for production of geological maps of the area.

The branch continued to keep available for distribution all maps of Manitoba and a new list of them was compiled and reproduced for general distribution.

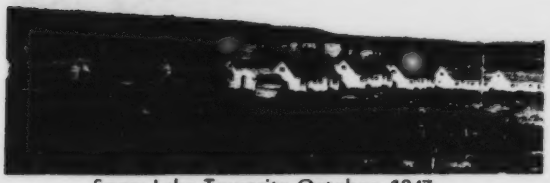
1945/46

This postwar year saw the extension of subdivision surveys in the Carrot River Settlement area, completion of the topographical surveys of the Netley and Delta Marshes, limited retracement surveys in the Parish of St. Clements and the Town of Selkirk and implementation surveys of the Birch River Veteran Settlement project.

A revision of the Municipal Map showing Local Government Districts, new plans for Public Shooting Grounds, a map of the Central Mining Area and a geological map of the Stull Lake area were among the mapping projects.

1946/47

The fieldwork comprised of continuing subdivision "retracement" for veteran settlement, township subdivisions in Duck Mountain Forest Reserve to assist forest officials in administration, survey of 118 summer resort lots, survey of Snow Lake Townsite and retracement surveys in the parish of St. Clements and St. Francois Xavier. Miscellaneous surveys included fishing site survey on Lake Winnipegosis and a reconnaissance survey of the unsurveyed portion of the Manitoba/Ontario Boundary.



Snow Lake Townsite October, 1947—
Houses on Blocks 9 & 10

In addition to the routine plans of survey and mining claim plans, special maps were produced by enhancing base maps, showing the distribution of Electoral Divisions, location of fish by species, predatory areas and location of game in Northern Manitoba.

1947/48

Additional subdivision surveys in the Duck Mountain Forest Reserve, retracement surveys of portions of St. Malo Settlement and Townships 24 & 25, Range 4 East, south of Washow Bay, and some miscellaneous surveys of the year were all over-shadowed by the survey of the decade--the completion of the Manitoba/Ontario Boundary.

Manitoba/Ontario Boundary Survey

The position of the line established by the survey of 1937 could not be considered final until the line was completed to Hudson Bay. While it had been the intention to complete the survey without undue delay, the war had necessitated deferment of the survey until a more opportune time.

J. W. Pierce sighting through the base line instrument—a Troughton and Simms, 1912 Base Line pattern micro-meter transit, being No. T.S. 1049 supplied by the Department of Mines and Resources, Ottawa.

The Manitoba/Ontario Boundary Commissioners—F. H. Peters (Dominion), H. E. Beresford (Manitoba) and F. W. Beatty (Ontario) decided to complete the boundary survey from Echoing River to Hudson Bay during the winter of 1947/48. The 168 miles were run by E. Gauer with J. G. Pierce (son of J. W. Pierce); as 1st Assistant and D. E. Guard as 2nd Assistant.

The line began at Mile 114 from 12th Base Line (Mon. *356) on Dec. 24, 1947 and was completed at Mile 282 (Mon.#457A) on April 6th, 1948. It struck 15.8 feet west of the point established on the shore of Hudson Bay in 1930 by C. H. Ney of the Geodetic Survey of Canada. The line was aimed 50 feet west of Mr. Ney's monument to coincide with the legally defined boundary terminal 89°00'00" longitude.

Breakfast Time

1. Ed Gauer, (Chief of Party) 2. Don Guard (2nd Assistant) 3. Bob Parkin (Pilot) 4. Ross Tate (Transitman and Camp Locator) 5. William Clancy (Chainman) 6. J. Robertson (Axeman) 7. Malachi Ross (Axeman) 8. J. Vincent (Chainman) 9. Frank Hanton (Pilot) 10. P. Daggitt (Chainman) 11. J. Robinson (Cook) 12. George Fothergill (Picketman) 13. Jack Pierce (1st Assistant) Others not specifically identified include Axemen and Mounders—J. D'Aoust, C. McLeod, J. Arthurson, Kenneth Robinson and Albert Robinson.

Some excerpts from Mr. Gauer's reports to Mr. Beresford give an indication of the situations faced by the surveyor-in-charge:

January 9th, 1948

We have just completed the move to camp No. 3, located on the east side of the Echoing River opposite mile 133.5. It was our first move by dogs. The party is shaping up very well, but it certainly was a tough struggle at the start. Everything seemed to go the hard way. Each load brought into the first camp was made with poor weather and the pilots deserve credit for getting the camp and initial supplies in when they did. We tramped 6 to 7 miles to the line for the first week or more trying for an observation, and to get the line moving. We finally established a fly camp at mile 118 and obtained our observation and caught up with the chainage.

January 27th, 1948

.....Not one of the dog-drivers speaks English and they have persisted in keeping a hot fire whenever they were in the tent.....They have been a very difficult crew to handle, complaints almost daily and up until about 10 days ago had always carried a threat to return home.

The line is now up to mile 146. It's been a struggle all the way, and as it is now 2:00 A.M. I am about to retire.

February 23rd, 1948

February 23rd. 1948, a marked improvement in our progress has been made since the dog teams left and we have resorted to the aircraft for moving camp.....

Every precaution is taken to ensure good production, and observations are being made as often as weather permits and when the line advances 10 miles beyond the previous observation, Mr. Pierce and I spent a night out to obtain a set, thus far we have taken three sets at night and not lost a day on the line. Pierce has shown great determination to see the line through to the coast and hold it as close to the true direction as is possible and practical. He has carried his full share, and put more time on the survey than anyone else....

Manitoba/Ontario Boundary Inspection Party

L to R - J. C. Uhlman, Director of Manitoba Government Air Service; C. B. Gill, Chief of Forest Management; H. E. Beresford, Boundary Commissioner (Manitoba); F. W. Beatty, Boundary Commissioner (Ontario)

On March 15th, 1948, these gentlemen together with R. Frederickson, a Departmental Photographer, arrived at Camp #13 on a Fairchild Husky (CF-MAO), piloted by Mr. Uhlman. The lake on which they landed has since been known as Commission Lake.

Guard is looking very well and thriving under the gruelling test. I have never seen him look better. I discovered to my surprise a few days ago that I was the oldest in camp, strange how time moves on.

The cook is doing very well, and though we haven't the usual variety we are well fed. Ross Tate is the fastest man on snowshoes and is doing good work at the front end. George Fothergill is the equal of Bill Leftrook with the picket. Though the axemen make a splendid team, Malichi Ross, George McLeod, and Jim Robertson are the heavy hitters. I am contemplating an objective of 55 miles for March which will put us close to the coast by April. We are set on reaching the Bay and if weather holds up the production during the day I have been giving some thought to producing at night.

(L. to R.) Commissioner H.E. Beresford and F.W. Beatty discuss the survey with E. Gauer.

The timing of the survey has been ideal. I doubt very much if we could have carried the line forward in the summer over some parts which have been crossed....

All members of the party are in good health and looking forward to crossing the ridge at mile 230 about the middle of March, should have our first view of Hudson's Bay from the air at about that time.

Jimmy Robinson—*an axeman turned cook* replaced an unsatisfactory cook on January 22nd, 1948

From an interview with Jean Hinds April 7th, 1949 re Manitoba/Ontario Boundary Survey 1947/48

How wide a path would you have to clear for the survey?
H. E. Beresford:
About 25 to 40 feet wide—in order to get a skyline of 8 to 12 feet. The skyline means that at the top of the trees you have to be able to see a space of 8 to 12 feet....

And when you found you'd hit so close to the marker--what did you do to celebrate? Open a keg of rum?
E. Gauer:
Not at that point. We were too busy. There was no celebration, but I believe every man got great satisfaction from being there.....

1948/49

Township outline surveys in the Cat and Euclid Lake areas, retracement surveys in the Parishes of St. Peter, St. Francois Xavier and High Bluff, continuence of township subdivision surveys in the Duck Mountain Forest Reserve were among the major surveys of the year.

An Air Photo Library was established on the mezzanine floor of the York St. government garage under the supervision of photogrammetrist Ernie Ramsey. The stock was made up from requests to the Royal Canadian Air Force and the Forestry Branch which supplemented the prints already on hand. At the end of the year there were 40,221 vertical prints and 25,000 oblique prints in the library.

The Annual Report for the first time highlights geographical names—*...The Director is continually receiving requests to check existing names of geographic features and to supply names for unnamed features. This entails considerable research and correspondence with the departmental officials in various parts of the Province.*

With the greatly increased program of aerial photography in recent years and the consequent increase in map production, the matter of place names is receiving greater attention and every effort is being made to avoid duplication and ensuring that suitable names are selected for new features.

March 2nd, 1948-J. W. Pierce visited "on line" by Manitoba Government Air Service Crew; 1½" × 48" iron pipe for Monument #410 in foreground.

1949/50

In addition to township subdivision surveys in the Birch River area, additional surveys in the Cat and Euclid Lake areas, the Branch accepted an assignment for the development of the Pine Falls Hydro-Electric power plant. It included all surveys pertaining to the acquisition of lands for transmission lines, flooding rights, road diversions, etc.

The location of the transmission line from Selkirk to Pine Falls, a portion of the severence line for the areas to be flooded, the right-of-way for the highway diversion and some drainage ditches were surveyed by C. E. Brock, M.L.S., G. Goldsworthy-Instrumentman, and L. Dartnell and I. Parker-Chainmen.

The largest summer resort survey in several years was conducted at Nutimik lake. New subdivisions or additions to existing subdivisions were also surveyed along the shores of Barren, Star, West Hawk, Caddy, Betula and Big Whiteshell Lakes.

A town planning scheme was approved for the City of Brandon. Planning assistance was also provided for Fort Garry, North Kildonan, East Kildonan, East St. Paul and St. James.

Maps and Mapping

The Annual Report summarizes the mapping and air photo program and it is reproduced here as a stepping-stone to the 1950's:

The Surveys Branch has been responsible for the maintenance of map supplies for the Province since the organization of the Department. By agreement, the Government of Canada has continued to compile and revise detailed topographic maps for the Province, provided the necessary surveys for ground control are made by this Branch. This agreement has continued in effect for twenty years and though the Branch has not been able to obtain all the revisions and new editions desired, the Federal Government authorities are guided to some extent on the priority placed on various districts.

At the present time twenty-seven maps, on a scale of four miles to the inch, for a large part of the province are available.

Maps on the scale of eight miles to the inch are available for the whole Province, while seventeen sheets on a scale of one mile to the inch are available in certain mining districts of Northern Manitoba.

All maps published by the Federal Government which pertain to Manitoba, together with the general maps of the Provinces, North-West Territories, Yukon, the Arctic and Canada are kept in stock in the Surveys Office and are available to all government departments and to the general public at reasonable cost.

While the Branch has not endeavored to produce the basic topographic maps for the Province, a number of special maps are compiled by the drafting staff for other Branches of the Department and all Government Departments.

The largest task is probably that of compiling geological maps for the Mines Branch. These maps are prepared to accompany the geological reports on various districts in which detailed surveys and examinations have been carried out. The following geological maps were completed: Wanipigow, Dunphy Lake, English Brook, Dawson Bay, Sickle Lake, Cat Lake and Winnipeg River Areas. A map of the Province showing oil wells was also prepared. Other base maps were made for the Mines Branch for the field use of geological parties.

A map of the Province showing the new Provincial Electoral Districts was prepared and printed. A map showing the restricted hunting areas in Southern Manitoba was made for the Game Branch. One new tower map was compiled and two others revised for forest districts in the Province.

Aerial Photography and Air Photo Library

The function of the Air Photo Library is analogous to that of the mapping service. Aerial photographs are of prime importance to any survey, investigation or planning which is contingent on surface features on the ground. Extensive use is now made of photo-prints on all engineering investigations and in forestry, geology, agriculture, town planning and many other enterprises.

In the absence of large scale topographic maps, aerial photos can implement considerable savings, both in time and money, on any type of field investigation. The photo library, therefore, offsets to a large extent the restriction which we must bear with respect to the mapping program for Manitoba, which is governed by facilities and priorities of the Federal Government.

The library has been maintained in recent years as a service to all the Departments of the Government and to any corporation or person who may have a bona fide use for this service. Photo-prints may be inspected in the library or an order from the government officials may be placed with the Director for prints required, and they will be secured from the National Air Photo Library at Ottawa.

A photogrammetrist is in charge of the library and he is prepared to assist anyone making enquiries on the selection, interpretation or use of the prints. During the year under review, the photogrammetrist has maintained his flight plans and index up to date and also prepared plans showing special features for the Lands, Forestry and Mines Branches, the Department of Agriculture and Public Works, the Manitoba Power Commission, Ducks Unlimited and for field surveys made by this Branch.

The library received 25,729 contact prints during the year, of which 16,000 were filed in the library and the remainder were forwarded to other branches for field and office use. At the end of the year the library had on file, 56,480 prints of vertical photographs and 30,000 obliques. The vertical photography has all been done by the R.C.A.F. and represents comparatively recent work, ninety percent of which has been done since 1945. The above vertical photography covers all of Southern Manitoba and extends Northerly to include the Central Manitoba Mining District on the east side of the Province, while on the west side coverage extends north to Kississing Lake which is approximately thirty miles northeast of Flin Flon.

November 29th, 1928

THE FIFTIES—BACK TO THE BASICS

Following a decade of war-effort and uncertainties in the economy, the Branch operations returned to the basics and gradually expanded as the Province continued its growth.

The completion of the Manitoba—Northwest Territories Boundary was a fitting finale to the 'The Fifties'.

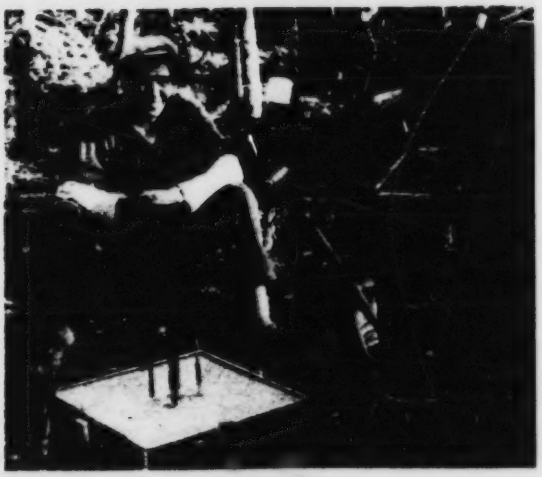
1950/51

The basics, as outlined in the original policy statement, were reflected in the Annual Report—*the field work has been of a diversified nature and comprised control and base line surveys and retracement surveys, subdivision surveys, townsites and summer resorts, topographic and level surveys, right-of-way for power lines, roads, drains and other surveys of a miscellaneous nature.*

The office work embraced the usual large variety of duties and included the compilation, drafting and tracing of numerous plans of survey; examination of plans of survey of mining claims; drawing up and checking legal descriptions for all dispositions of Crown Lands; calculating areas and preparing sketches; daily revision of the sectional mining claim sheets; filing of files, field notes and aerial photographs; attending to map requests and sales of maps and blue prints; answering enquiries regarding surveys and maps and performing the many other duties devolving on a Branch which endeavors to give efficient service to all Branches of the Department, all Departments of the Government and to the general public.

Field Work

MONUMENTATION OF THE MANITOBA-ONTARIO BOUNDARY



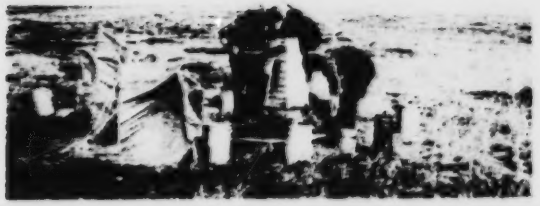
Base of monument #368 (August 2nd, 1950)

The trial line of the Manitoba-Ontario Boundary run in 1947/48 was so accurate that both provinces passed legislation accepting it as the true boundary. During the period July 2nd to August 26th, 1950 permanant reinforced concrete monoliths were constructed at twelve mile intervals between Island Lake and Hudson Bay at sites accessible by aircraft or canoe.

(L to R) Manitoba Government Air Services Pilots R. "Bob" Hunter and N. "Norm" McCoy not only transported men and equipment during monumentation but dropped cement and gravel to the survey crew with and without parachutes.

Survey Party

Chief of Party	D. E. Guard, M.L.S.
Chainman	J. H. Dick
Cook	J. Robinson
Laborers A. Rodier,	W. T. Redhead
K. Robinson,	G. McKay
J. Robertson,	M. Bee



Construction of the final monument#457A at Hudson Bay

Don Guard stands beside the completed monument (C. H. Ney's 1930 monument is in background)

Surveyors E. Gauer and J. G. Pierce stand next to monument #457A during their inspection trip

THE 1950 FLOOD AND A PROPOSED FLOODWAY

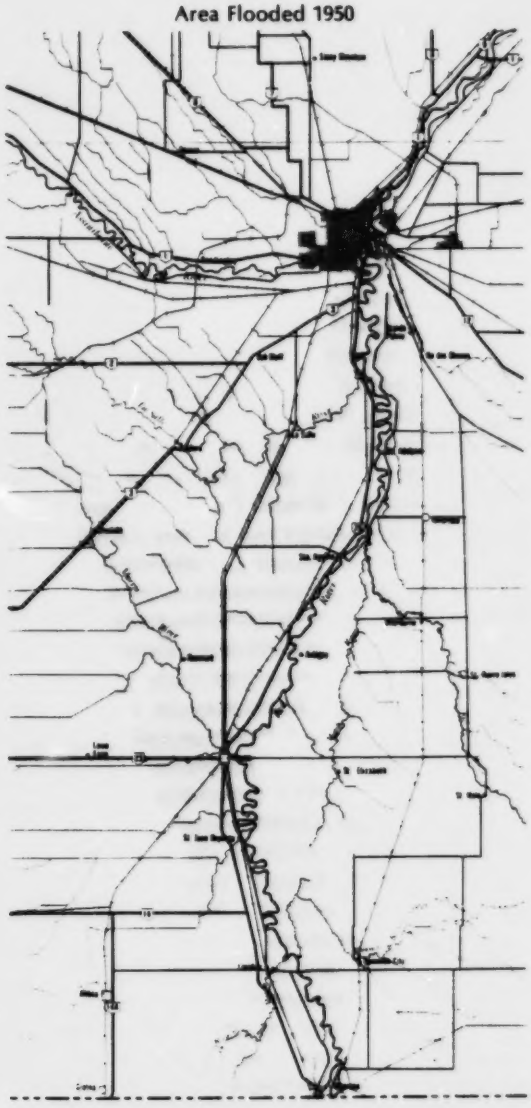
The emergency which arose during the spring flood of the Red River deferred the movement of all survey parties into the field until after the critical period had passed. All staff not engaged on special duty, worked on emergency dykes or assisted on evacuations.

The annual report mentions field work on a proposed floodway—

Shortly after the critical period of the flood had passed, consideration was given to remedial works. In response to a request for elevations along a proposed flood diversion channel from St. Norbert to Lockport, the Surveys Branch placed two level parties in the field to obtain the data. The information was assembled in convenient form on a plan and forwarded to the Projects Engineer for further investigation with regards to surface and subsurface obstructions.

Following the appointment of the Greater Winnipeg Dyking Board, the Surveys Branch was requested to give immediate assistance on preliminary surveys to expediate the compilation of estimates for an early start on construction. Four level parties were assembled from the field staff and an immediate start made on the survey. Preliminary surveys were made in the Municipalities of East Kildonan, West Kildonan and Fort Garry.

Area Flooded 1950



Control levels were run in St. Vital and a list of bench marks established was forwarded to the Municipal Engineer to carry out the survey. By mid-July, the Dyking Board had assembled sufficient staff to carry on and the field notes of the surveys made were transferred to the Board.

The flood had also affected the mapping program of the Branch. In cooperation with the Federal Government, prompt action was taken immediately after the flood to remap portions of the Red and Assiniboine valleys at a scale of one mile to one inch. The air photo library also showed its usefulness in the emergency by plotting outlines of lands covered by water and compiling a list of farming units affected under different stages of flooding.

22nd BASE LINE SURVEY (January 2—March31)

Base line surveys had been shelved during the 1940's due to the war and post war projects but this essential work was resumed in January 1951.

Survey Party

Chief of Party	D. E. Guard
Assistant (Main Production and Observing	Ross Tate
Pilot Transit	John Bachynsky
Head Chainman	Milt Fawcett
Rear Chainman	Elmore Shaw
Leveller	G. Reynolds
Rodman	J. R. Managh
Check Leveller/Chainman	George Kolba
Rodman/Check Chainman	Paul Landry
Mounder	Pete Rodier
Picketman	Hugh Sanderson
Cookee	Sam Kozub
Cook	Joe Coles

Another Mounder and Six Axemen from Norway House: Raymond Bayer, James Robertson, Joseph Robinson, Thomas Monias, Paul D'Aoust, John Moar and Norman Apetagan.

(L to R) Ross Tate and Don Guard—tired and tattered nearing the end of the survey.

On March 26th, 1951 a tent used by the survey party burnt to the ground with considerable loss of personal effects to Adrien Rodier, Hugh Sanderson, Sam Kozab, Paul Landry and Elmore Shaw. In a letter from H. E. Beresford to J. G. Cowan, K.C., Deputy Minister—*All the men sustaining loss did excellent work on the base line survey and the investigation showed that it was through no fault of theirs that the fire occured. All the evidence points to the fact the air tight heater in the tent had deteriorated to the extent that a hole had burned through the side of the stove and a spark or sparks had ignited the moss or spruce boughs on the floor of the tent....*

As it was not policy to replace lost personal effects an exception was made in this case with Cabinet approval for $^{2}/_{3}$ reimbursement.

During this survey, control for aerial mapping was obtained by pin-pointing prominent features on aerial photographs and identifying them on the ground. The positions of these points were recorded on the back of the photographs for future reference.

Air Photo Library Staff: J. Larcombe, E. Ramsey and R. Down.

Office Work

Sample activities unique to this year were gleaned from the Annual Report—

SURVEY PLANS

A large addition to our stock of township plans was made... , when the Department of Mines and Technical Surveys at Ottawa discontinued carrying a stock of these plans for the Western Provinces. Manitoba received the entire stock of 60,168 plans at no expense other than freight charges.

MAPS AND MAPPING

Mapping done by the Surveys Branch is limited in scope and provides for the special requirements of the various Branches in the Department... The large highway map on a scale of eight miles to one inch was revised and a new issue published. Geological maps prepared from sketches supplied by the Mines Branch were prepared for the Central Manitoba Mining Area and the Wanipigow Area. New maps of the Whiteshell and Sandilands Forest Reserves were compiled and two tower maps revised for the Forestry Branch.

AERIAL PHOTOGRAPHY AND AIR PHOTO LIBRARY

...The cost of contact prints to government departments has been 50% of the cost to private corporations and the general public. Up to the year 1950, the prices had been 20 and 40 cents respectively, but during the year an increase of 25% was made in both prices, making the present cost 25 and 50 cents respectively...

As at March 31, 1951, the number of photographs in the library was as follows: Obliques 31,000, Verticals 73,380 or a total of 104,380 prints...

PLACE NAMES

As representative for the Province of Manitoba on the Canadian Board on Geographical Names, the Director attended a meeting of the Board in February, 1951. The Manitoba list of deceased decorated military personnel from World War II having been practically used up, a list of some 300 names of persons eminent in the development of the Province and now deceased, was submitted to the Board for the naming of geographical locations and approved at the meeting...

A card index of place-names has been set up in recent years which greatly simplifies the checking of names and assists in avoiding duplications of new names adopted.

TOWN PLANNING

...Seventy-six plans of subdivision were examined and either approved or recommendations made with regard to the revision of lots or streets. Five new town planning schemes were approved and seven other schemes were examined with regard to new drafts or amendments; six amendments were approved, four of which applied to the Fort Garry Town Planning Scheme.

1951/52

Field Work

The number of surveys made for government organizations outside the Department exceeded those of other years. Much of this work was related to flood protection within Greater Winnipeg, the Pine Falls and McCarthur Falls power development projects on the Winnipeg River and the extension of National Defense Airports for training purposes.

With the implementation of a five year program of forest inventory mapping, the Branch, in cooperation with the Forestry Branch, undertook to provide all ground control surveys required and to provide control sheets for aerial mapping.

Bill Hayward

Bill Hayward, a long time branch employee, washes his clothes during the Duck Mountain Forest Reserve surveys of control blocks for forestry management. Mr. Hayward would relate stories of his early Dominion Land surveys before the Surveys Branch existed. On one such expedition he was the "explorer" who would roughly map the twelve miles on either side of the survey line making notes on the fauna, flora, and topography of the area. Mr. Hayward passed away in 1952.

22nd AND 23rd BASE LINE SURVEY

22nd Base Line (Rge. 14 to 29) and 23rd Base Line (Rge. 24) (January 4th, to April 2nd, 1952)

Survey Party

Chief of Party	Ross Tate*
Assistant (Main Production and Observing)	Allen Roberts*
Instrumentmen	John Bachynsky, Milt Fawcett*
Leveller	George Kolba*
Picketman	Adrien Rodier
Chainmen	Ted Stevens, B. Rotoff
Rodman	Ron Aird
Bullcook	John Moar
Cook	James Robinson
Mounders	Raymond Bayer, Herbert Mowatt
Axemen	James Robertson, Thomas Monias, Kenneth Robinson, Joseph Robinson, Alan Ross

*Branch Staff—All others on time certificate

(L to R) John Bachynsky, Jimmy Vincent, George Kolba, Milt Fawcett, Adrien (Pete) Rodier (Others unknown)

In a memo to Mr. Beresford dated January 15th, 1952 Mr. Tate wrote... *The new men Roberts, Rotoff and Aird are still having a little trouble with their snowshoes but they are keeping up their end of the work.*

Allen Roberts and the Base Line Instrument—Troughton & Sims #1618 of 1912 Pattern

An incident occured in March which aroused much discussion and made the survey an even more memorable one. Mr. Gauer outlined the incident in a memo to Mr. Beresford dated April 21st, *22nd Base Line Survey—Infraction of the Game Law....Mr. Tate advised me on return from the survey that owing to a delay on the third and final shipment of meat, he has run extremely low in his supply. After careful consideration he had found it necessary to resort to wild meat, taking one moose for that purpose....*

Office Work

Map Compilation and the Air Photo Library

With reference to map compilation equipment and the air photo library, the following statement appeared in the annual report:
The Branch has no specific mapping equipment apart from a few small instruments in the Air Photo Library. The mapping program therefore is limited to work which can be done by draftsmen and is confined to the revision of the 8 and 20 mile maps of Manitoba and the preparation for printing of any special maps required for purposes of administration or development.

The vertical coverage is now almost complete south of latitude fifty-seven degrees, although a large gap remains to be done.... The Photogrammetrist (E. Ramsey) is engaged on the compilation of special maps from photographs as required by the Department and other government departments which do not have the personnel trained for this special work.... He was engaged on the setting up of control sheets for forest mapping and completed control by slotted templet for 2016 square miles (one half mile to the inch), and 1296 square miles (one quarter mile to one inch).

Retirement—D. N. Sharpe

On March 29th, 1952 a farewell luncheon was held at Moore's Restaurant in Mr. Sharpe's honour. Several of his major surveys have been documented.

1952/53

Field/Office Work

The following excerpt from the annual report gives the reader a recap of the background of the organizational relationship of the field and office operations.

All field work is directed from the Winnipeg office which services as headquarters for the entire survey staff. Though a major division into field and office work is desirable for administration, each division is in a measure dependent on the other. Any specific field operation starts with a search of office records and ends with the plan of the survey compiled in the office. Such plans are the basis of all subsequent legal descriptions prepared in the office and also provide the data for instructions, control and examination of all subsequent surveys made in the field.

Matching aerial photos prior to map compilation

Besides the 20th Base Line Survey the three major surveys were related to government projects: a) ground control for forest inventory mapping b) summer resort development in Whiteshell Forest Reserve and c) the McArthur Falls Power Development. Miscellaneous surveys included a school site at Stonewall and R.C.A.F. Air to Air Firing Range on the ice of Lake Manitoba near Oak Point.

20th Base Line Survey (January 10th—April 3rd, 1953) (Ranges 4 to 21 W.P.M.)

The survey party consisted of 20 men with R. A. F. Tate in charge. Other known members included A. C. Roberts, T. Stevens, K. Vincent, L. Neuwirth and L. Menard. Eleven men were hired from Norway House.

The Annual Report provided a brief synopsis of activities of the following Boards and Commissions: Land Board, Mining Board, Canadian Board on Geographical Names, Historic Sites Preservation Advisory Board, Manitoba—Ontario Boundary Commission and the Planning Advisory Committee.

In Recognition

A significant contribution was made by C.E. Brock, M.L.S. (1948/49—1950/51) and G.J. Goldsworthy, M.L.S. (1949/50—1952/52), during their tenure with the Surveys Branch. Many of their surveys were related to the Pine Falls and McArthur Falls power development projects and summer homesite lots as well as the several miscellaneous surveys undertaken by the Branch.

1953/54

Field Work

This year the Branch felt the impact of a buoyant economy coupled with a shortage of technical personnel when surveyors D. E. Guard, G. J. Goldsworthy, and R. A. F. Tate resigned. Considerable success was achieved in obtaining new appointees which included Nova Scotia Land Surveyors D. W. Crandall and L. E. Boutilier.

It was necessary to drop plans for a base line survey because of the reduction in staff. However, two major surveys in addition to several miscellaneous surveys were completed: a control traverse survey and a power development survey.

CONTROL TRAVERSE SURVEY—COBHAM RIVER AREA

Very little work had been done in this area and control was required for forest inventory mapping. A survey party with Jack Stewart (M.L.S.) in charge included D. Crandall, L. Boutilier, Alf Disbrowe, his son Bud Disbrowe and Louis Neuwirth (chainman).

Bombardier, tractor and sleigh attached to the traverse survey.

The traverse covered 109 miles of country through which transportation was exceptionally difficult. Ground transport was provided by bombardier and a small tractor and sleigh. Assistance on transport was also received from the Manitoba Government Air Service. Ground transport and fuel supplies were sent to the area via Riverton and Berens River to the Cobham River along the existing winter road to Island Lake. The route for the traverse followed the rivers and lakes wherever feasible, but a considerable part of the road had to be cut by the survey party.

(L to R) Alf Disbowe, Louis Neuwirth, Bud Disbrowe having lunch beside the Cobham River en route to a new campsite.

The traverse was made by transit and chain and all distances were check chained. Bearings were checked at intervals by astronomic observations on Polaris. A tie was made to the Manitoba-Ontario Boundary and all computed positions along the traverse were based on geographic position of the boundary monument. Control points for mapping were pin pointed on aerial photographs and tied into the traverse. Survey monuments were placed at intervals of approximately three miles for future reference.

McARTHUR FALLS POWER DEVELOPMENT

During the summer, under the supervision of Allen Roberts, 56 miles of the severence line for the storage basin above the power plant were located, levelled and surveyed, as well as 31 miles of retracement surveys necessary to make the ties. The Branch was reimbursed by the Manitoba Hydro-Electric Board for the full cost of these surveys.

Office Work

New maps compiled included; Sandilands Forest Reserve, revision of Duck Mountain Tower Map; a map of Northern Manitoba showing all registered trapline districts east of The Pas; Southern Indian Lake and Island Lake registered trapline districts; two special maps for use in hunting season; two geological maps and six topographical maps of the Cedar Lake and Moose Lake areas.

1954/55

Field Work

Major surveys included the extension of the basic survey system, expansion of summer resorts on Crown Lands, ground control for forest inventory mapping, northern townsites and the McArthur Power Development.

MERIDIAN AND BASE LINE SURVEYS

(January 5th to March 28th, 1955)

These surveys included: the extension of the Provincial Meridian northerly for twenty-four miles to the northeast corner of Township 92; from there the 24th base line was surveyed two miles west; the 23rd base line was surveyed easterly from the Principal Meridian to the northeast corner of Section 34-88-11 E.P.M.; the 22nd base line was surveyes across Range 11 E.P.M. and the east outline of Range 10 E.P.M. was surveyed across Township 85 to 90 inclusive. The total length of line cut, surveyed, levelled and monumented was 132 miles. A chained traverse was also surveyed for six miles on Limestone Lake to obtain control point on the eastern limit of aerial photography coverage in the area.

Survey Party

Chief of Party	Allen Roberts
Assistant (Instrumentman)	Ted Stevens
Leveller	Lionel Boutilier
Chainmen	David Crandall, John Duncan, George Lewko (1), Colin Reekie (2), Ernie Debusschere, Fred Fenner
Rodmen	Dean Gould, Publius Fiddler
Pilot Transitman	Osborne (Ossie) Isfeld
Picketman	Al Mazurat
Mounders	Joe Robertson, Jim Woods
Axemen	Donald Paynter, Joshua Spence, Ken Robinson, Jim Robinson
Cook	John Vatsel
Cookee	Andrew Robertson

(1) George Lewko was injured early in January and Ernie Dubusschere was sent up to replace him.

(2) Colin Reekie resigned on February 22nd and Joshua Spence was hired to replace Fred Penner who moved up to a chainman position.

TELEVISION CREW VISITS CAMP

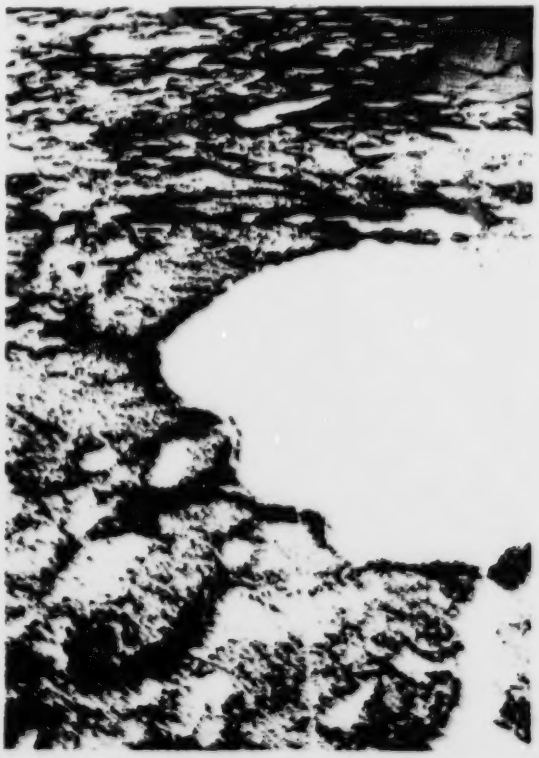
In his memo to Mr. H. E. Beresford dated January 18th, Allen Roberts stated:—*on January 10th a Mr. H. Nixon from television station C.B.W.T., Winnipeg visited our camp to take some film shots of work on this Base Line.*

I gave Mr. Nixon all the cooperation I could, and in order to make his work easier, and enable him to move to other projects he intended photographing the same day, I had the party enact their various tasks on the ice or in the bush a few feet from camp. A surveyor knowing this type of work may notice the locale, but I didn't think it would make any difference to the film.....

Mr. Beresford replied on March 3rd:
.....The television broadcast on February 23rd was disappointing in that only two scenes of the base line survey were shown, that is the axemen cutting line and Ted Stevens at the transit.....

(L to R) David Crandall, Fred Fenner, Lionel Boutilier, Ernie Debusschere, Osborne (Ossie) Isfeld—ready to commence a traverse on Limestone Lake for photo control.

On February 2nd, 1955 Mr. Roberts penned—*The survey is running a lot more smoothly now and the members of the party are now used to their jobs.....Everything is working well so far although we had a day of 48° below yesterday and some of the instruments tightened up a bit.....*



An aerial view of the 23rd Base Line looking west from NE 36-88-10 E.

(L to R) Pubius Fiddler, Donald Paynter, Allen Roberts, Joe Robinson, Ken Robinson, Joshua Spence, Joe Robertson—ready to leave for home.

110 volt lighting plant outside the office tent (Remembered for it's weight—220lbs.)

Office Work

The drafting and air photo library staff jointly compiled some special map projects: control sheets for forest inventory mapping; Cedar Lake and Moose Lakes; Summerberry Marsh; Assiniboine River basin for flood prevention investigation; and portions of the Nelson River being investigated for power development.

Maps credited to the drafting staff were: two forestry tower maps for Northern Manitoba; a new map of Sandilands Forest Reserve; four geological and one oil well location map; geological sections for oil fields, four registered trapline district maps, and revisions of the eight mile road map and the twenty mile base map for Manitoba.

1955/56

Field Work

The major surveys included:
The control surveys in the vicinity of Mystery and Moak Lakes, the legal surveys related to the Carrot River, Washow Bay and Catfish Creek settlement projects, the McArthur Falls Power Development, 140 northern townsite lots and 550 summer resort lot surveys.

21st BASE LINE SURVEY
(January 6th to March 30, 1956)

This survey consisted of 99 miles of meridian and base lines in the vicinity of mining developments at Mystery and Moak Lakes.

Survey Party

Chief of Party	Allen Roberts
Assistant	Ted Stevens
Leveller	Lionell Boutilier
Pilot Transitman	Dave Crandall
Chainmen	Mac (Red) Turner,
	Don Brown, George Lewko,
	Clarence Goodwin
Rodmen	Alf Reimer
	Publius Fiddler
Picketman	Ernie Debusschere
Mounders	Joe Robertson
	Jim Woods
Axemen	Fred Fenner, Donald Paynter
	Ken Robinson and son
	Jim Robinson
Cook	Alex Demarais
Cookee	Andrew Robertson

The mounders move up to a new monument site.

Cook Tent, January 21st, 1956

Packing parachute packs with supplies for a drop to the "fly camp"

Office Work

All work other than field operations is classed in the annual reports under office work with these sub-headings—Plans, Maps and Mapping Aerial Photography and Air Photo Mapping, Sectional Mining Sheets, Approval of Plans, Legal Descriptions, Place Names, Town Planning, Boards and Commissions and a Conclusion being a synopsis of office work. (A cumulative summary of these "Conclusions" is included in the appendix)

E. Ramsay—in charge of First Air Photo Library

At the end of 1955/56 the Air Photo Library had 106,232 vertical and 31,000 oblique photographs on file.

All mapping in the library was done by the slotted templet method with topographic details added by use of a sketchmaster.

R. Turnbull on Slotted Templet (Lay-down) Table

R. Mathieson (foreground), adding topographic details with use of sketchmaster, and R. Turnbull in Air Photo Library.

1956/57

Field Work

More surveys than usual were done for other departments and agencies and they included: a reduced program for the Manitoba Hydro-Electric Board, assistance on field surveys through the summer for the Highways Branch, survey of the rights-of-way for dykes along the Assiniboine River, the township outline survey in the Moak Lake area was the major program of the year.

A Birds Eye View circa December 1957

TOWNSHIP OUTLINE SURVEY— MOAK LAKE AREA

(January 9th to April 1st, 1957)

The decision of The International Nickel Company of Canada, Limited, to proceed with the construction of a mining plant at Mystery Lake made it prudent to establish additional survey control in the district. The development of the mine would involve the survey of several thousand claims in addition to townsites, roads, railways, transmission lines, etc.

Progress on the survey, however, was hampered by heavy cutting along the survey lines and a poor distribution of lakes which could serve aircraft used in moving camp. As a result of the above and other factors, the milage completed during the season was below normal with a total of 70 miles being surveyed.

In his general comments in the survey report Mr. T. H. Stevens stated:

There was a lot of activity going on in the air with planes and helicopters and on the land with tractors, trucks and ground parties of survey and construction workers.

Every day some evidence was seen of prospector or magnetometer grid crews.

Due to Inco hiring everyone who wanted to work, there were no trappers in the area.

The weather in January was exceptionally cold with temperatures on the line frequently below -60°F. In February and March the temperatures were higher than usual but with the sky cloudy for weeks on end. In March, mid-day thaws occured almost daily.

Survey Crew at work circa March 1958

Office Work

On April 1st, 1956 the following office staff were listed on the attendance sheet:

Clive Armstrong	Draughtsman I
Margaret Barton	Clerk-Steno II
Harry Beresford	Director
Percy Crealock	Storekeeper
Jack Larcombe	Draughtsman I
Rollie Mathieson	Photogrammetrist
Dave Perry	Draughtsman I
Ernie Ramsay	Draughtsman III
Leo Simoens	Clerk I
Bob Turnbull	Tracer
Jean Watson	Clerk-Steno III

Office work was maintained, with some difficulty, at a level comparable to former years due to an appreciable turnover in staff.

The major mapping projects included: Revisions to the 20 mile map of the province, compilation of Provincial Electoral Division maps on the 8 and 20 mile base maps, planimetric mapping of 7030 square miles and preparation of 2505 square miles of photo mosaics.

A large number of records of the old Topographic Surveys Branch at Ottawa were transfered to Manitoba, and in addition to a multitude of files, a large number of original plans of early surveys in Manitoba were received. (Many of these items contributed to the historical background of the Province and subsequently have been placed in the Provincial Archives.)

1957/58

Field Work

Field surveys were confined to current projects and developments, which meant a curtailment of those surveys falling within the long term category such as establishing further survey control in the north.

Surveys were made in the Pasquia River, Birch River and Catfish Creek land development projects for roads and drains.

The largest single survey program was for summer home sites on Crown lands with lake frontage. The Whiteshell was the most popular area, but additions to many existing subdivisions were made in widely scattered locations including two new lakes, Bird Lake, east of Lac du Bonnet, and Bower Lake in the Turtle Mountain Forest Reserve.

In addition to Departmental requirements, surveys were made for The Manitoba Hydro-Electric Board and the Prairie Farm Rehabilitation Act administration.

Office Work

The following maps were compiled or revised: Forestry maps for Spruce Woods, Northwest Angle and Sandilands Forest Reserves, the eight mile Road map, registered trapline districts of Swan River and the Whiteshell, Whiteshell tourist map, Local Government District of Consol, limnological map of Southern Manitoba, Hunting areas of Southern Manitoba and a special map showing northern developments.

Maps compiled from aerial photographs by the library staff for special purposes covered a combined area of 16,010 square miles. Mosaics were prepared mainly for the Forestry Branch covering a total area of 2,171 square miles.

1958/59

Field Work

The control survey network was expanded during the year with two major projects—the Manitoba-Northwest Territories Boundary survey and the township outline surveys in the Thompson area.

Moving Camp #12 using "Otter" (CF-MAX) aircraft attached to survey party

MANITOBA-NORTHWEST TERRITORIES BOUNDARY SURVEY

Mining developments in the north and the need to define the boundary on the ground for administrative purposes had brought about the survey of the northern boundaries of Alberta and Saskatchewan. The survey of this boundary reached the north west corner of Manitoba in 1957 and, upon approval of the Manitoba and Federal governments, preparations were made for the continuation of the boundary survey to Hudson Bay.

The northern boundary of the Province was defined in 1912 as the 60th parallel. Survey of the boundary was under the direction of the Manitoba-Northwest Territories Boundary Commission, which had two members, Mr. R. Thistlethwaite, Surveyor General of Canada, Chairman, and Mr. H. E. Beresford, Director of Surveys, representing the Northwest Territories and Manitoba respectively. Field operations for the survey were administered through the Surveys Branch. All charges pertaining to the boundary survey were divided equally between the Provincial and Federal governments.

Lionel Boutilier eating lunch behind windbreak on steep esker.

The survey got off to a stormy start when the party was snow bound at Lynn Lake for a few days. But at 10:35 AM January 3rd four men left with two Otter aircraft (MAU, MAX) to establish camp #1 at Kasba Lake. The aircraft stayed at camp for 45 minutes just long enough time to drop off L. Boutilier, L. Brooks, H. Wagner and C. Sanderson and their gear in the wilderness.

Mr. Boutilier recalls they had a strange feeling that night hurrying to get a tent set up and a stove going. The lakes were blown clear of snow and the sound of the ice cracking sounded like thunder. Their link with civilization was the radio which reported a temperature of -62°F. Mr. Brooks says it was so cold you could hear your breath crackle as it froze.

The survey was started from the most easterly monument of the northern boundary of Saskatchewan from which a short chord was run easterly to place a monument east of the Manitoba-Saskatchewan boundary. The survey was then continued easterly 109 miles on chords measuring 486 chains. The direction of successive chords was checked by astronomic observations. All distances were check chained. Levels and check levels were also run with a spirit level and bench marks established at intervals of approximately one mile. Water or ice level was recorded for all lakes, rivers and creeks crossed by the line. The boundary was monumented as the survey progressed at intervals averaging about one and one-half miles. Monuments consisted of a bronze tablet set in rock with a stone cairn marking its position; these were placed at chord intersections and at intervisible summits.

The country covered by the survey was comparatively rough with numerous lakes and some prominent eskers. A fair growth of stunted trees provided shelter and fuel for the survey camps. This growth thinned out considerably in the last twenty-five miles and the last six miles of the survey were across the barren tundra.

Looking East towards Monument #76

Survey Party

The addresses are provided for out of province personnel.

Chief	A. C. Roberts, M.L.S. (Staff)
Assistant	L. E. Boutilier, M.L.S. (Staff)
Head Chainman* 500 link tape	K. H. Veal, Langenburg, Sask.
Rear Chainman 500 Link tape	W. T. Arnot, Edmonton Alta.
Head Chainman 200 foot tape	L. S. Brooks, (Staff)
Rear Chainman 200 foot tape	L. Richard, Caroline, Alta
Leveller	W. Y. Clost, Manor, Sask.
Pilot Transitman	H. R. Wagner, Regina, Sask.
Picketman	P. Courtoreille, Fort Vermilion Alta.
Rodmen	V. Foldy, B. Lindsay,
Mounders	G. W. Wordie, E. Adam, (both) Uranium City, Sask.
Axemen	S. Mankewich, L. Mankiewich R. J. Burns
Cook/Cookee	Carl & Clarence Sanderson (both) Fort Vermilion, Alta.
Toboggan Driver	A. Durocher Ile à la Crosse, Sask.
Toboggan Mechanic & Driver	D. M. McCraig Regina, Sask.
Pilots/Engineers	Manitoba Government Air Service

CF-MAX (Jan.) F. Hanton/Bruce Eaton
CF-MAU (Feb.) R. J. Hunter/R. Fitzpatrick
CF-MAX (Mar.) J. Blair/R. Campbell

*NOTE: All previous surveys referred to "check chainmen" who verified the main chainmen's distances. On this survey and subsequent inter-provincial boundary surveys there were two independent measurements made by seperate pairs of chainmen. The deviation between the two distances was tested against established accuracy criteria ano if acceptable, the mean of the two distances was accepted as the final distance.

Carl Sanderson making bread

In his memo to H. E. Beresford dated February 1st, 1959 Mr. Roberts states—.....*The survey is now running quite smoothly and I'm sure production of daily line will show improvement. The bush is quite thick and heavy and compares with cutting on other base lines. I did not anticipate such heavy bush but the axemen have proved very capable workers....*

The weather up here has been the severest I have ever experienced, the wind blows at 25 mph even in-40° temperature. Most of the members of the party have frozen some part of their face by now, but the spirits and health of the entire party apart from Lindsay and Arnott is very good and Arnott seems to be feeling alright now....

The cook has proved just as capable as any I have had and prepares excellent meals. His work has contributed much to the high morale of the party.

Camp #5—Office Tent, Power Toboggan

Daily Diary Details

Exerpts from Mr. Roberts' diary provide an in-sight into weather conditions in Manitoba's northernmost frontier.

Thursday, February 12th, 1959:

Axemen cut twin silver spruce both 15" diameter, very straight. Many animal tracks west of Camp #5 which include wolf, martin, otter, rabbit, ptarmigan and also saw three raven flying in vicinity of line....

Friday March 27th, 1959:

Weather: Overcast, clearing, wind S.E. 15 & gusting to 20. Temperature- +8° to +35°

Men to work. Front end of line and L. Boutilier up near end of chord at end of day. Toboggan picked them up and into camp.

Chainmen chained about ½ mile but wind over barren hills impossible to work, both chains and plumbobs badly blown by strong winds. Leveller went about 1 mile but even with only eight foot rods, they couldn't hold them straight....

Moving Camp

Monday, March 30th, 1959:

Weather: Overcast High, winds S.E. at 10. Temperature: +15° to 0° to +5°

Flew to line and completed survey to end of chord #18 made good monuments and checked chainages, etc. Picked up about 4:30 p.m. by aircraft and returned to camp. (Ragnar Jonsson returned to camp for leftovers).

Sky was broken after supper, so about 10:30 p.m. I took T2 out to start of Chord #18 and obtained observation just before it clouded over with snow. Had difficulty with time check as radio fading. Finalized time certificates, etc. before breakfast.

Looking East toward monument #51—distinctive large stone, as blasted, is strongly supported by mound

Survey Statistics
(from Boundary Commissioner's Report)

Boundary Completed	109	Miles
Monuments placed	78	
Rock post, stone mound	68	
Post in iron pipe, stone mound	10	
Monument interval, average	1.25	Miles
Monument interval, maximum	5.74	Miles
Monument interval, minimum	0.06	Miles
Bench marke established	112	
Average distance between bench marks	0.98	Mile
Boundary, clearing, blazing, monumenting average	2	Miles/day
Camp moves	12	
Days lost due to weather, transport	5	
Accidents	1	Major
	4	Minor
Sickness in camp	4	Minor cases
Labour Relations		good
Party Strength	20	

TOWNSHIP OUTLINE SURVEY—MYSTERY LAKE AREA
(January 12th to April 19th

Township outlines had been surveyed in previous years, but to cope with expanding area covered by claim surveys additional township outlines were surveyed during the winter. The township outlines would also serve as control for subsequent surveys and land dispositions as development of the area progressed.

A True Fish Story

Murray Foster poses with this 19+ lb. northern pike, (jackfish) which jumped to the occasion from the camp's wedge-shaped water hole. One March Sunday he was fishing from the water hole and, being fed up, just yanked his lure out. As luck would have it, the fish followed the lure into the hole, panicked and jumped onto the ice. The crew enjoyed a fresh fish supper.

Survey Party

Chief of Party	T. H. Stevens M.L.S.
Assistant	M. Q. Foster
Pilot Transitman	Wm. McCulloch
Leveller	J. Beck
Head Chainman—500 link	C. Goodwin
Rear Chainman	A. Watson
Head Chainman—200 foot	J. Browne
Rear Chainman	L. DeBruin
Rodmen	W. Handford
	B. C. Rowley
Picketman	E. Debusschere
Mounders	G. Beard
	J. Wood
Axemen	D. Paynter
	B. Arthurson
	P. Fiddler
	K. Robinson
	J. Saunders
Cook	J. C. Faranski
Cookee	A. Robertson

Mr. Stevens' report to Mr. Beresford:

On January 12th:

I arrived at Thompson Wednesday evening after a rather rough trip. The trail was not the least bit as was described by several people last summer. It was very fortunate for us that a Fisheries Bombardier was going part way. Altogether there was 90 miles of trail that was completely unbroken. We had no mechanical trouble except that the skis of both machines were rather badly bent....

January 26th:

....No doubt you know we have lost the lighting plant. This will mean a purchase of mantles and generators.

Albert Watson fell on a stump and went to the doctor at Thompson. He will be back working after the move.

Men and equipment in good condition.

and on February 10th:

....We are now camped on the Burntwood River 4 miles west of Thompson. We have completed the line that was started two years ago. We are now starting the 12 miles of the west and north boundary of Township 77-Range 3. The mileage is counting up rather slowly....

The last meat order had at least 100 lbs of bones in it. I will check both meat and grocery orders tomorrow. The second meat order seems to be the same as the last or it possibly has more bones. The first box we opened contained several hocks that were almost completely bone....

Mr. Beresford replied on February 12th:

....In checking your order I note that it was specified as boned and wrapped (hips and loins)! This should therefore not contain much bone though the price of $65.55 per 100 lbs. is quite reasonable....

T. Stevens examines the remains of a wooden survey post, circa July 1958

Office Work

The number of survey plans examined and filed reached a peak due to the large number of surveys for mining claims at Thompson and Chisel Lake. Other work included the compilation of survey plans and maps, revision of mining sheets, preparation of mosaics, drafting of legal descriptions and other related work.

These excerpts from the annual report shed some light on the years office activities:

MAPS AND MAPPING

...New maps compiled during the year include: The Big Game Open Season 1958, revision of Southeastern Manitoba Forestry Tower map, Fisheries chart of Falcon Lake, road map for 1959 revised and prepared for contract printing.

AERIAL PHOTOGRAPHY AND PHOTO MAPPING

The air photo coverage of the province maintained in the Air Photo Library has become a very important and essential service to various branches of the Government and commercial agencies. Aerial photographs are increasingly used to supplement investigations and field surveys in the surveyed areas and particularly so in the unsurveyed areas where the province is accelerating the development of its natural resources and road building program.

The Surveys Branch, as the central agency for the purchase of all aerial photographs for the government, acquired 10,130 contact prints of vertical photographs through the National Air Photo Library at Ottawa during the year. Of these, 6,459 photographs were supplied to various departments as requested and 3,581 were filed in the Library. Total photographs now held in the Library include 116,265 verticals and 31,000 obliques, making a total of 147,265.

The Library staff, in addition to satisfying many requests for informa ion as to topography of an area and giving assistance in interpreting aerial photographs, are continually compiling maps from aerial photographs. During the year maps compiled for special projects covered 8,145 square miles, mosaics were prepared covering 2,095 square miles.

1959/60

Field Work

COMPLETION OF THE MANITOBA-NORTHWEST TERRITORIES BOUNDARY

An objective set for the 1959/60 season was to survey the remaining 140 miles of the boundary over the barren lands. The Boundaries Commission recognized that new techniques in transportation and living accomodation were required. Arrangements were made for using a tractor train consisting of two D6 tractors, 3 freight sleights, 3 sleeping cabooses (wanigans) and one freight caboose. The original plan was to proceed with the tractor train northwesterly from Churchill to the starting point, but the available guide forced them to take the alternative route—"up the coast". Carl Johnson was hired as a guide on this route and he returned to Churchill when the 60th parallel was reached.

Before starting the survey all members of the party took an arctic survival course at the Army Base in Churchill. An advance party of 8 men left Churchill for the 60th parallel (170 miles) on January 25th and arrived there on February 7th after 117½ hours en route.

Survey Party

Chief of Party	A. C. Roberts, M.L.S.
Assistant	T. H. Stevens, M.L.S.
Head Chainman-500 link	K. Veal
Rear Chainman	C. Goodwin
Head Chainman-200 foot	L. S. Brooks
Rear Chainman	L. Debruin
First Leveller	W. Jaster
Second Leveller	J. Beck
Rodman and Spare tractor driver	J. Ross
Rodman	L. Splett
Mounder in charge of dynamiting	L. Mankewich
Mounder and spare tractor driver	S. Mankewich
Pilot transitman	E. Dubusschere
Picketman	W. Kowalsky
Tractor driver and to help mounders	G. Beard
Tractor driver	F. Baxter
Cook	J. Bodin
Cookee	A. Cloutier

From March 28th, 1960 to end of season:

Main line production and night observations	L. E. Boutilier, M.L.S.
Assisting with 200 foot chain	Wm. McCulloch
Assisting main transitman with ties and mounding	R. Bastin

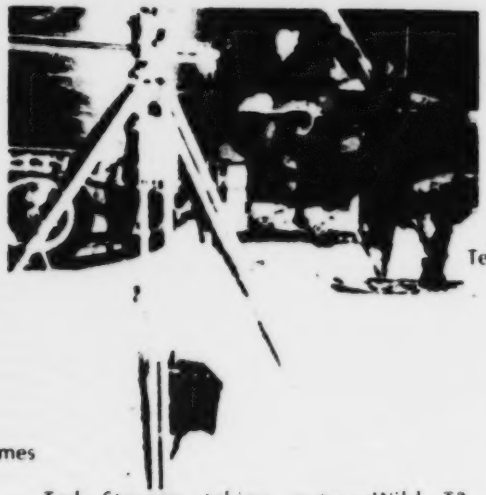
A preliminary line to guide the chainmen and levellers was marked out. The perminent line was then produced with greater care to establish the position of all boundary monuments. The direction of the perminent line was then checked by azimuth observations on Polaris at intervals of approximately six miles and the line corrected when necessary to maintain the required direction of the boundary.

Supper in Cook Caboose

(L to R) Walter Kowalsky, Steve Mankewich, Ernie Debusschere, George Beard, Leon Mankewich, Frank Baxter, John Bodin

COMPLETION OF THE MANITOBA-NORTHWEST TERRITORIES BOUNDARY SURVEY (1959/60)

Leveller Werner Jaster and Rodman James Ross in action



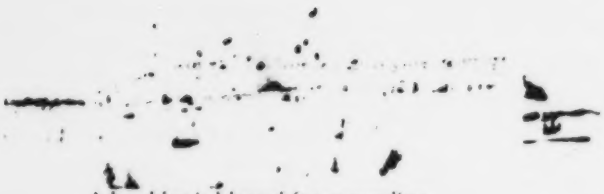
Ted Stevens taking notes—Wild T2 theodolite set up with six volt battery for night observations.

Ted Stevens pulls his equipment on sled.

Igloo made during blizzard as experiment.

Ted Stevens at Monument #80

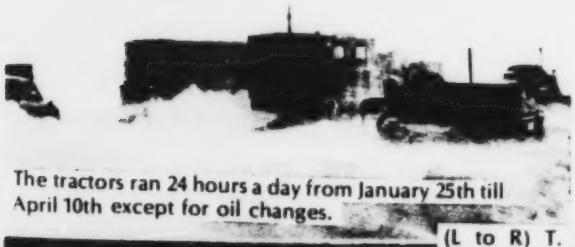
Pionjar drill in use



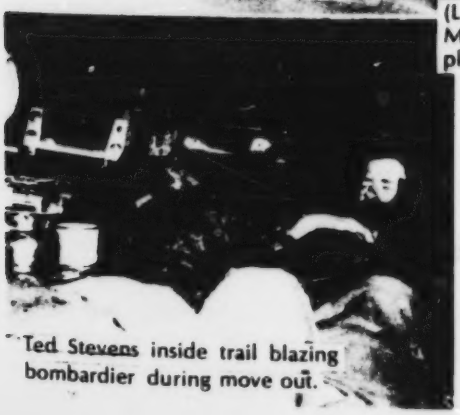
A boulder is blasted for mounding.

Camp during a blizzard

Both D6 tractors were used to bulldoze a 3500' × 150' runway for the DC3 aircraft bringing additional supplies.

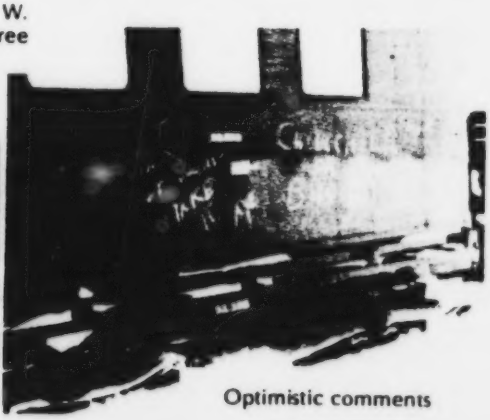


The tractors ran 24 hours a day from January 25th till April 10th except for oil changes.



Ted Stevens inside trail blazing bombardier during move out.

(L to R) T. Stevens, L. Brooks, W. McCulloch, L. DeBruin using free plumb bob method of chaining.



Optimistic comments

In his memo to Mr. Gauer dated February 15th Mr. Roberts wrote—...*February 8th was another blizzard. T. Stevens tried to locate road west but visibility was down to about 100 feet so he gave up. I flew up the coast from Churchill (February 10th) in fact our only accurate means of navigation was the tractor road, and I was able to see how many detours were required around points and bays to make the trip. The broken ice on the shore is very rough and when the tide was in they had to watch for water. The train had to follow every bay and other variation of the high water line and only rarely were they able to cross points of land, because boulders prohibited it. I am sure there was no delay other than the one day of blizzard and the numerous halts for repairs.*

The rest of the party were flown in on February 19th and 3 days later the tractor train arrived at a point four miles east of the stopping point of the 1958/59 Survey.

Daily Diary Details

Thursday, February 11th, 1960:

Weather: High overcast, clear visibility, light wind, Temperature: -25°

Went ahead in Surveys bombardier with T. Stevens and E. Debusschere to end of yesterday's road. Tried to locate lake at end of road on photos or 1 mile map. Drove around shoreline to help identification, but very difficult becouse of low swampy shoreline. To help recognition of position drove 1 mile North and 1 mile South—no recognition. Then drove 1 mile West and saw high point from which I could recognize lakes on one mile map. Retraced steps and with considerable difficulty located red trail shown on Ottawa strip map and travelled 14 miles through bad rock pile.

Message from Mr. Gauer re hitches, etc. Discussed with drivers and general opinion is that chains are only repairs of much value at this stage. To modify hitches would take time and material, neither very plentiful up here.

Monday, March 21st, 1960:

Weather: Blizzard; winds 50-55 mph gusting to 60; vis. 10 ft. in blowing snow. Temperature: -10°

I awoke at 4:00a.m. with the rocking of the caboose in an extremely high wind. Got up to the worst blizzard yet experienced. The drifts were up to 4 to 5 feet round the cabooses. Both tractors were still running o.k., but the cook had trouble with gas pressure, although a new tank was switched on.

The winds lessened as the day progressed and by supper visibility was almost unlimited in a clear blue sky with the setting sun only slightly hazy in a wind down to 15-20.

I hope for a fine day tomorrow to once again get the party up to pitch to finish the survey.

Wednesday, March 23rd, 1960:

Weather: Clear in a.m.; wind N.W. 15-20; blowing snow after 10:00 a.m.; wind 30-35 gusting. Temperature: -28°

Received message from Mr. Gauer re return of tractors, etc. Men rather upset, but determined to finish survey by April 1st and will work longer hours to do so. If weather is favorable, can be done easily.

Went out to work, but men had to quit about 10:30 a.m. because the wind had increased to 35 mph and visibility was down to 50 feet or less. Interlined and located Monument #135 because over 3 miles between stations. Had to give up at 11:00 a.m. and returned to single caboose left at last nights camp. Other cabooses moved to lake 5 miles east. Chainmen caught second tractor and went into new camp. Pilot transitman and picketman walked in and just made it before visibility went out—rather close.

A very poor day and rather depressing at this stage when I have everyone tuned up to push the survey through and return with the tractors.

Monday, March 28th, 1960:

Weather: Wind North 10 mph Temperature: -36°

Made 7 miles of line today. Men on line from 7:30 a.m. till 7:00 p.m. All very pleased with days work; all check out except levels a few hundredths over.

Aircraft arrived with men and camp equipment. Moved 7 miles to camp lake, arriving at supper time. Organized for tomorrow to make use of men, then L. Boutilier and self went out for observation and returned about 3:00 a.m., then started another day at 6:15 a.m.

When he arrived with Bill McCulloch and Dick Bastin Mr. Boutilier recalls the men in the tractor trains were happy to see someone from down South!

Wednesday, April 6th, 1960:

Weather: Overcast with fog and blowing snow; wind S.E. at 15-20 Temperature: 0°

Weather still poor but tractors headed south after an early breakfast. I remained with Surveys bombardier, keeping L. E. Boutilier and two mounders, while T. Stevens took Army bombardier to locate road ahead of tractor train.

April 6th, 1960 Mon. No. 171 completed at the Hudson Bay

(L to R) Leon Mankewich, Lionel Boutilier, Steve Mankewich

We completed line production under very poor visibility and built last three monuments, made ties to Ney's monument and tried for sea levels, but gave up and took approximate high water mark. Very difficult to locate in this area.

At 2:45 p.m. we headed south and caught up to the tractor train which had gone 23 miles by supper time. After supper tried to locate road ahead in both bombardiers but blizzard had increased and visibility had reduced to about 1500 feet, so decided to stop for the night rather than get into difficulties as we had,lost the old trail and couldn't locate it at all, and couldn't see coast line.

Sunday,April 10th, 1960:

Weather: Overcast; light snow; wind south 15 mph

Went out in bombardier , locating road upstream and across Churchill River, and met train arriving at top of "Lightning Mountain" where we escorted it to the Army Base where we all sorted out the equipment, etc. and then proceeded to the hotel.

A relief to have everybody with all equipment back in Churchill. Men very tired after a grueling journey, but spirits were all high. This survey could never have been completed as it was had the calibre of men been less. They proved the best party I have had.

Army equipment left at Fort Churchill. Cook caboose taken into town.

The survey covered 139.8 miles, compared to 109.35 miles in the first season. Monuments erected on the boundary consisted of short bronze posts cemented in rocks or pipes which were driven into the ground. Stone cairns, 30, inches high. with a base of 5 feet square, were erected at each post.

Survey Statistics

(from Boundary Commissioners Report)

Boundary Completed	140 Miles
Monuments placed	93
Rock post, Stone mound	77
Post in iron pipe, stone mound	16
Monument interval, average	1.5
Monument interval, maximum	2.92
Monument interval, minimum	0.42
Bench marks established(77 P. Rock included)	137
Average distance between bench marks	1.02
Boundary, surveying and monumenting, average	4.4 Miles/day
Camp moves	Each working day
Days lost due to weather, transport	7 Days
Accidents	Nil
Sickness in camp	Nil
Labour relations	Good
Party strength	18-21

Office Work

MAPS AND MAPPING

A number of maps were revised and printed and they included:

20 miles to 1 inch Base Map
8 miles to 1 inch Base Map (Southern portion)
Whiteshell Area map enlarged to include Bird Lake

Some new maps were:

The Forestry Tower Map of Southeastern Manitoba
Falcon Lake Golf Course
Falcon Lake Depth Chart (Plan #1903)
Grid Maps for Lands Branch Soil Survey

AIR PHOTO LIBRARY

More and more government and business personnel were using photography to save time and money through the development and construction stages of their projects. This was reflected in these statistics: 9017 photographs were purchased for other branches; 12,311 photographs were loaned out.

TOWN PLANNING

An exerpt from the Annual Report—

Mr. H. E. Beresford, the retiring Director, retained the office of Comptroller until January 31st, 1960, when it was transferred to the Department of Industry and Commerce.

During the last decade planning had been given far greater emphasis than at any period in the past. Though the consideration and attention given to this work was national in scope, its impact on Manitoba was very appreciable.

The Comptroller, while operating in the Branch during the year, dealt with a record number of town planning schemes. Many of these were schemes pertaining to minor contraventions to existing schemes. A large number of subdivision plans were also examined in co-operation with the Municipal Board And recommendations made with regard to their approval or amendment prior to approval.

All records of the Comptroller of Town Planning were transferred to the new Department in the early part of February, 1960.

Retirement—H. E. Beresford

On July 31st, 1959 Mr. Beresford retired as Director of Surveys after 39 years of service to the province. He had been with the Surveys Branch since its inception in 1930.

THE SIXTIES—
SURVEYS AND MAPPING ON THE MOVE

The advancement of technology was destined to contribute to a more accurate and economical survey and mapping program. The reader will recognize the contributions throughout this decade with the use of tellurometers for distance measuring, two-way radios for on-line communication, helicopters for transportation, computers for calculations, stereo plotters and scribing for map compilation - to name a few.

Highlights of the sixties include the consolidation of the branch services on the eighth floor of the new Norquay Building, the ceremonial survey monumentation of the Manitoba-Saskatchewan Boundary, the dedication of the Centennial Survey Monument and surveys and mapping services for the Agricultural Rehabilitation and Development Act (ARDA) and the Fund for Rural Economic Development (FRED).

1960/61

Field Work

MANITOBA-SASKATCHEWAN BOUNDARY

In conjunction with the Legal Surveys Division of the Federal Department of Mines and Technical Surveys, and the Surveys Branch, Department of Natural Resources, Province of Saskatchewan, the Branch continued the survey of the Manitoba-Saskatchewan Boundary during the 1960's.

(L to R) Mounders J. Ross (assisting while M. Deley was injured) and G. Beard, both 'solid men', walked many miles with their 100+ lb. packs.

The drawing for the stamping of bronze cap #72 marking the last monument survey in the 1960/61 season.

The surveys were made under instructions issued by the Manitoba-Saskatchewan Boundaries Commission, which consisted of representatives from the three governments—Mr. R. Thistlethwaite, Chairman - (Canada), Mr. E. Gauer - (Manitoba) and Mr. A. I. Bereskin - (Saskatchewan).

Between January 9th and April 3rd, 1961 a survey party of 20 men, 10 from each povince with a Manitoba Government Air Service pilot and engineer attached, surveyed 118.3 miles of new boundary and retraced and monumented 5.5 miles of existing boundary. They reached the 58°02'38" North Latitude on the Boundary.

Bill Schwartz, a welcome humourist who 'kept the crew in stitches'.

Survey Party

Chief of Party	L.E. Boutilier, M.L.S.
Assistant-Main line production and observing	W. Schwartz, S.L.S., D.L.S.
Head/Rear Chainmen 500 Link	K.H. Veal/L. DeBruin
Head/Rear Chainmen 200 Foot	L. Brooks/J. Melanson
Leveller	S. Rose
Mounders	G. Beard, M. Deley
Pilot Transitman	R. Bastin
Picketman	A. Fontaine
Rodmen	A. Carriere (1), K. Barnes, J. Ross, T. Kanak (2) E. Debusschere, S. Mankewich, A. DeBruin,
Cook	E. Madsen
Bull Cook	S. Sanderson
Radio Operator at Lynn Lake	N. Atkinson
Pilots (alternating)	R. Paquin, J. Blair F. Hanton
Engineers (alternating)	R. Fitzpatrick, B. Eaton

(1) February 8th—A. Carriere cut his left hand and was replaced by K. McGregor on February 11th.

(2) March 11th—N. Cook replaced T. Kanak who left for home on account of a family emergency.

Observations from the Surveyor's Report—

The main and most discouraging difficulty encountered during the winter was the many accidents which occurred.

January was an accident free month. During February three men were off work for a total of eight days due to minor accidents and in one case one man had to be replaced.

Two more men were off work a total of nineteen days, one on account of a bad case of boils, and the other whose son was critically ill and was called home. This man returned to work on February 28th and went home for the remainder of the survey on March 11th as his son had suffered a relapse.

Mr. Boutilier recalls this survey as if it were yesterday. He believes the high morale on many surveys was usually due to the camp humourists like Bill Schwartz who would keep them 'in stitches almost every night'. Of the back injuries, fractured ribs, serious cuts and bruises mentioned in his report and diary, he recalls that Mr. Gauer said *My God, were you on a survey or a military exercise?*

L. Boutilier at work in the office tent

SOME MISCELLANEOUS SURVEYS

Thirty-one miles of transmission line and other legal surveys were conducted for Manitoba Hydro.

An investigation survey was carried out at the community of Moose Lake to determine the extent of flooding from the proposed Grand Rapids Hydro Project.

A total of 53 miles of survey were made on the Pasquia Settlement Project for roads, drains, lake traverse and adjoining section lines.

An expansion of the Province's recreational facilities resulted in the survey of 574 new summer cottage lots in a variety of areas and, in the Duck mountain Forest Reserve, 43 miles of access roads.

Office Work

SURVEY PLANS

As a reminder to the reader, all surveys completed by staff surveyors are shown on plans drafted in the office then examined and filed in the Land Titles Offices or the Surveys Branch. Many of the 111 plans prepared during 1960/61 dealt with subdivisions primarily in Forest Reserves. Other plans covered roads, transmission line rights of way, drains, water control works and isolated parcels of land.

MAPS AND MAPPING

A revision of the 4 miles to 1 inch base map of southern Manitoba was made ready for reduction and printed at a scale of 8 miles to 1 inch. Other maps printed during the year included: a revised 20 mile base map and 8 mile road map, Delta Shooting Grounds, cottage lot subdivision key maps of Falcon Lake, Childs Lake, Clearwater, Pointe du Bois, and a composite map of Thompson.

The annual report states—*the library now carries complete photographic coverage of Manitoba, excepting part of the Churchill area and a small triangle in the northeast corner....*

Maps compiled at a scale of ½ mile to 1 inch slotted template control covered 3,864 square miles, sketch-mastering was carried out for 1,250 square miles and mosaics at ¼ mile to 1 inch were prepared for 4,339 square miles.

NOTE: Subsequent years during this decade will contain only highlights of office work. For statistics see appended table.

1961/62

Field Work

MANITOBA-NORTHWEST TERRITORIES BOUNDARY

Allen Roberts and Werner Jaster completed a levelling tie to sea water at Hudson Bay and obtained additional star observations for azimuth between August 31st and September 19th. Their Pilot was B. Parsons, a private contractor.

Mr. Roberts' diary gives this account of the evening of September 6th:

....Tried two attempts to take off but pilot decided to split load. After two trips to lake west of monument No. 152, we established camp on the south side. The pilot decided to stay the night so we cooked supper. At the same time the wind started to blow from the northwest. The pilot had secured the aircraft with a sea anchor away from shore and a tie to a rock on shore. As the wind increased

to 40—50 mph the pilot had us help him tie the aircraft away from a large rock. I fell in. Pilot slept in the aircraft. We went to sleep in our tent which was looking like a sail boat. At 2:30 AM the pilot woke us up to secure the aircraft again. The wind was about 45—50 mph and waves were 3—4 feet high. Went back to bed but woke again with the tent on top of us.

W. Jaster preparing for an observation.

MANITOBA-SASKATCHEWAN BOUNDARY

The objective of surveying the remaining 135.5 miles of this boundary was accomplished between January 9th and April 6th, 1962. At the intersection with the Northwest Territories boundary a special aluminum monument 30 inches high was erected standing on a 8' pipe base left 18 inches above ground and inscribed with Manitoba, Saskatchewan, Northwest Territories. A sand and stone base was the foundation used.

Survey Party

Chief of Party	L.E. Boutilier, M.L.S.
Alternating Assistants	R. Madden, S.L.S. W. White, S.L.S.
Head/Rear Chainmen 500 Link	R. Bastin/B. Larsen
Head/Rear Chainmen 200 Foot	L. Brooks/J. Melanson
Leveller	A. Sippola (1)
Pilot Instrument	W. Jaster
Mounders/Motor Toboggan Operators	G. Beard S. Mankewich
Picketman	E. Debusschere
Rodmen	K. Stocker R. Truthwaite
Axemen	A. Carriere, A. Cook (2), R. Cook J. Ross, D. Thomas, J. Hamrlik
Cook	E.C. Madsen
Cookee	V. Kayfish
Pilots/Engineers	R. Hunter/ R. Fitzpatrick (Jan.) J. Blair/B. Eaton (Feb.) R. Paquin/ R. Brandson (Mar.)

1. L.E. Boutilier, M.L.S., 2. R. Madden, S.L.S., 3. R. Bastin, 4. B. Larsen, 5. L.Brooks, 6. J. Melanson
7. A. Sippola, 8. W. Jaster, 9. G. Beard,
10. S. Mankewich, 11. E. Debusschere, 12. K. Stocker
13. R. Truthwaite, 14. R. Cook, 15. J. Ross,
16. D. Thomas, 17. J. Hamrlik

(1) Sick with pnemonia, A. Sippola was flown out January 16th to Lynn Lake.

(2) A. Cook was injured when a tree struck him in the side—S. Cook was hired to replace him. March 20th S. Cook left from Lynn Lake with badly decayed tooth and earache. R. Cook, from Brochet, took his place.

From the Surveyor's Progress Report—

January 14th:
...The snow this year is exceptionally deep. In the bush it's 3' to 4' deep, making very hard work shoveling out for tents. Very little of the tent is showing above the snow....

The snow came early up here this year before the ice built up on the lakes, causing the lakes to slush. This creates a problem in landing for the aircraft....

This problem can be overcome by packing a runway down with the aircraft the day before the move leaving it to freeze overnight. The ice in the lakes is between 20"—30" whereas last year it was approx. 5'.

Some of the men had colds on arrival in camp and now about 50% have either the cold or flu. It does not seem to be too serious. I have had it myself and am now feeling better. So far no one has lost any time at work.

January 28th:
The weather has been quite severe to date, and a total of 2½ days were lost on account of it. The first day was mentioned in my first report. The second day lost, the temperature dropped to -57°F below and a high of -45°F with strong winds. As the line was in burnt-over country, it was impossible to work.

R. Paquin 'shovels out' for the office tent

February 14th:
Triangulation was required for a small portion of the boundary at the northwest corner of Whiskey Jack Lake in order to obtain the distance up the south side of a very steep hill. This hill rises 450 feet vertically on the south side.

Daily Diary Details

March 20th:
....Aircraft arrived in camp at 4:30 PM with (Boundary Commission Members) Mr. Gauer, Mr. Thistlethwaite and Mr. Bereskin....
(The Boundary Commission Members left camp on March 23rd)

Monument #120 with rock drill in foreground

April 6th:

Monument No. 156 was completed being P. (post) in pipe and S.M. (Stone Mound). The remainder of the day was spent in erecting the aluminum cairn at the intersection of the Northwest Territories and the Manitoba-Saskatchewan Boundary....

CONTROL SURVEYS—GYPSUMVILLE AREA

Between January 15th and March 29th, a survey party of 12 men under the leadership of M.Q. Foster surveyed 65.5 miles of township outlines north of Gypsumville. They also retraced 19 miles using a tractor with an angle dozer to open line and prepare a trail suitable for camp cabooses and freight sleighs.

A Surveys Branch picnic was held in August at E. Gauer's cabin on the south shore of Falcon Lake.

(L to R) John Klaponski, Glen Johnston, Jack Countryman, Ed Plezia, Nils Lindberg

(L to R) Norma and Rollie Mathieson, Sandy Lindberg, Dave and Evelyn Lane, Phil Pelequin

Office Work

A decision to consolidate the department's drafting staff resulted in the transfer of three 'draftsmen', P. Pelequin (Forestry), D. McTavish (Lands) and C. Lewis (Mines) to Surveys' staff as well as the responsibility for their charts, sketches, illustrations and graphs.

(Mr. Lewis, although within the Surveys Branch appropriation until 1965/66, was never physically transferred)

1962/63

Field Work

CONTROL SURVEYS

Two survey parties were assigned to establish additional control for forest inventory mapping in the northern Interlake.

Survey Party #1

They surveyed 76.5 miles of new township outline and retraced 9½ miles of base line between January 8th and April 1st.

Chief of Party	M.Q. Foster
Assistant	A. Rezansoff
Head/Rear Chainmen 500 Link	B. Larson/A. Fontaine
Head/Rear Chainmen 200 Foot	G. Still/R. Warburton
Leveller	R. Lea
Rodman	G. Lempen
Mounders	S. Mankewich, F. Lavallee, W. Chernichan, H. McKay
Axemen	T. Mankewich, O. Link, W. Thomas, W. Sholikowski, J. Hamrlik
Cook	S. Holloway
Bull Cook	J. Kirkwood (1)
Pilots	J. Blair, F. Hanton

(1) J. Kirkwood resigned February 22nd and was replaced by P. Breland.

(L to R) (seated) T. Mankewich, S. Mankewich, A. Sholikowski, J. Hamrlik, (standing) P. Breland, S. Holloway

Survey Party # 2

Operating a tractor equipped with brush cutter, they surveyed 94 miles of new township outline and retraced 6 miles of base line between January 7th and March 29th.

Chief of Party	T.H. Stevens
Leveller	W. Kraus
Rodmen	M. Kehler, D. Nahuliak
Chainman	D. Snaith
Cook	S. Komplien
Tractor Operator and Owner	N. Sasnella
Mounders	G. Beard, B. Decker
Axeman	J. Birston

Summer Resort Surveys—J. Beck

Office Work

MAPS AND MAPPING

Maps prepared or revised for printing included: a composite map of Snow Lake, base maps of Duck Mountain Forest Reserve, Renewable Resources Regions, Bélair Forest Reserve, Turtle Mountain Provincial Park, and Delta Waterfowl Control Area, 22 lakes plotted for Fisheries Branch and three section maps (8 miles to 1 inch) for Travel and Publicity Branch of the Department of Industry and Commerce.

AERIAL PHOTOGRAPHY AND PHOTO MAPPING

A new projecting machine, the Map-O-Graph, and a wax applicator with electric drive was purchased to broaden the scope and output of the library by enabling more accurate enlargement tracings and an increase in mosaic construction.

1963/64

Field Work

MANITOBA-SASKATCHEWAN-NORTHWEST TERRITORIES MONUMENT CEREMONY

On August 16, 1963, a ceremony was performed at the special monument erected at the intersection of the boundaries. The event culminated four winters of boundary surveys which produced a total of 503 miles.

The three Ministers shake hands across a common boundary point. Hon. E. Kramer, Saskatchewan Minister of Natural Resources (left), Hon. W.M. Benidickson, Federal Minister of Mines and Technical Surveys (centre), and Hon. C.H. Witney, Manitoba Minister of Mines and Natural Resources (right). Each Minister read an address which was placed in the monument along with several other articles of interest to their successors in 2063 when the monument will be opened.

Other dignitaries at the ceremony included members of the Manitoba-Saskatchewan Boundary Commission—R. Thistlethwaite (Canada), E. Gauer (Manitoba) and A.I. Bereskin (Saskatchewan).

Speeches are filmed for posterity.

CONTROL SURVEYS

A party of 23 men, including the pilot and engineer, surveyed the 20th Base Line from NE 36-76-22 W.P.M. to the 2nd Meridian West and the 23rd Base Line across Ranges 25 and 26 W.P.M. to Dunphy Lake.

A total of 60 miles of new base line, with 5 miles of retracement, were surveyed between January 6th and April 1st, 1964

Survey Party

Chief of Party	L.E. Boutilier, M.L.S.
Assistant	M.Q. Foster, M.L.S.
Leveller	M. Goodwin
Instrumentman	A. Watson
Head Chainman	A. Rezansoff
Second Chainman	B. Larson
Chainmen	J. Raby, A. Pitura
Rodmen	D. Kemhyr, S. Gabriel
Cook	B. Gander
Cookee	P. Breland
Mounders	G. Beard, T. Packulak
Picketman	A. Fontaine
Axemen	W. Boychuk, G. Small
	A. Semeniuk, S. Olender
	F. Stranger

From the Surveyor's Progress Report—

January 31st, 1964:
....The bush is very dense and the axemen are able to progress by only 1 mile per day.

These men have never been on snowshoes before, and are not too fast in travelling to and from camp. So far I have spent most of each day axing with them, as well as one or two chainmen.

According to the photographs, the bush appears to thin out a bit to the west, and I assume better progress will be made....

Lunch hour on the 20th base line

Mr. Boutilier recalls this survey—he eventually ended up with a crew of axemen from Pukatawagan who were able to cope with the dense bush. Some replacements were: F. Caribou, D. Thomas and J. Caribou.

A tent, burned during the survey but without any loss or injury.

Other control surveys included a traverse of a portion of Lake Winnipegosis in the Dawson Bay area, and a pin-point survey from a helicopter—features were identified on the ground from aerial photographs and then tied-in to existing survey monuments.

Office Work

From the Annual Report—

MAPS AND MAPPING

A very detailed series of these (topographical) maps at the scale of 1:25 000 has recently been published and 23 maps at this scale are now available for the Greater Winnipeg area and the Spruce Woods Forest Reserve—Shilo area... the number of maps available in the 1:50 000 series increased from 315 to 322...

Three plans with various overlays in the ARDA (Agricultural Rehabilitation and Development Act—Federal Provincial Rural Development Agreement) project areas—Interlake, South of and adjoining Riding Mountain National Park and the Duck mountain area have been completed as far as studies have been made.

AERIAL PHOTOGRAPHY AND PHOTO MAPPING

....14,559 sq. miles of mosaic were produced (10,497 sq. miles for the ARDA projects)....

There were 5,348 recent air photos purchased and added to the library bringing the total to 136,312 on hand....

Mapping control using slotted templet laydown....3,323 sq. miles at a photo scale of ¼ mile to 1 inch in the area of the new photography.... 1,008 sq. miles of sketchmastering of existing slotted templet control was completed in Northern Manitoba for geological mapping.... the new Map-O-Graph was in constant use enlarging or reducing topographical details for Lands Branch plot sheets, mining claim sheets, survey plans, township diagrams, checking topography on mining claims and shore lines for limnological surveys for Fisheries Branch.

1964/65

Field Work

MANITOBA-SASKATCHEWAN BOUNDARY

The authority of the Manitoba-Saskatchewan Boundary Commission was extended, in December, 1964, to provide for the survey of all unsurveyed portions of the boundary and the resurvey of the southern portion.

Between January 4th and March 31st,1965 a party of 18 men surveyed a 63 mile gap in the boundary from the 18th Base Line to the 20th Correction Line across rugged country north of Flin Flon. To establish the position of the boundary, normally fixed by the 19th Base Line, it was necessary to run an additional 28 miles of trial line.

(1) M.Q. Foster, M.L.S., (2) L. Brooks, (3) J. Raby, (4) B. Larson, (5) E. Sochski, (6) A. Fontaine, (7) J. Yakusik, (8) S. Mankewich, (9) P. Breland, (10) A.Carriere, (11) L. Carriere, (12) D. Goulet, (13) R. Paquin, (14) A. McAuley.

Survey Party

Chief of Party	L.E. Boutilier, M.L.S.
Assistant, Observer & Main Line Production	M.Q. Foster, M.L.S.
Head/Rear Chainmen-500 Link	L. Brooks/J. Raby
Head/Rear Chainmen-200 Foot	B. Larsen/E. Sochaski*
Pilot Transitman	A. Fontaine
Picketman	J. Yakusik
Mounder & Mechanic	S. Mankewich
Assistant Mounder	D. Parker
Cook	P. Breland
Cookee	G. Carnie*
Axemen	A. Carriere*
	L. Carriere*
	P. Pelly*, A. Morin*
	D. Goulet*, R. Cook*

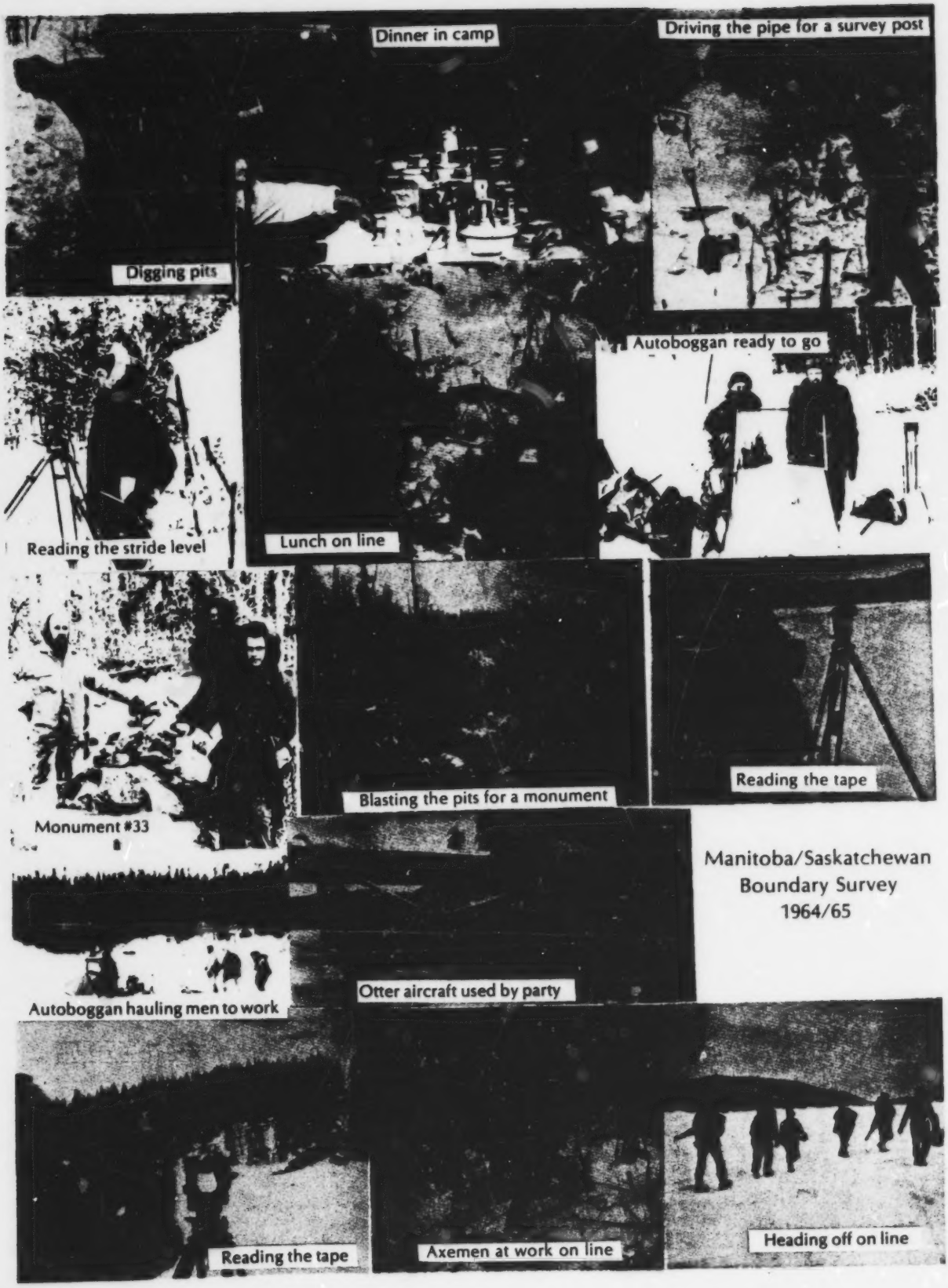
*Saskatchewan Members

Alternating Pilots: J. Blair, F. Hanton, R. Paquin and J. McPherson.
Alternating Engineers: R. Branson, R. Fitzpatrick and B. Eaton.
Staff Changes:
D. Parker was replaced by L. Macumber who subsequently was replaced by A. McAuley. P. Pelly and A. Morin were replaced by A. Stewart and P. Bighetty.

From the Surveyor's Progress Report—

January 19th:

It was not until the morning of the 9th that the line to the North of the 18th Base Line was actually started and on that morning everything seemed to go wrong.


Dinner in camp
Driving the pipe for a survey post
Digging pits
Autoboggan ready to go
Reading the stride level
Lunch on line
Monument #33
Blasting the pits for a monument
Reading the tape
Manitoba/Saskatchewan
Boundary Survey
1964/65
Autoboggan hauling men to work
Otter aircraft used by party
Reading the tape
Axemen at work on line
Heading off on line

First, a T1 Instrument which was left out overnight in the usual manner was damaged by a dead tree which was blown over during the night. This Instrument was from Mr. Bereskin's office which I have now returned along with a report on the accident.

Secondly and most serious, Mr. David Goulet one of the axemen from Cumberland House was struck a glancing blow on the head and shoulders by a large dead tree which was in turn knocked over when struck by another tree cut by an axeman. This man was in the hospital at Flin Flon for several days, but is now in camp working as a bull cook.

Thirdly, Mr. Gill Carnie one of the mounders fell while carrying a mounders pack and hurt his right knee. He is now in the hospital with his leg in a cast. I am going to see him on Thursday to fix up his time and accident reports and arrange for him to go home.

Fourth, a vital part on the rock drill broke while drilling rock for the first monument.

In all, it was a very discouraging day.

It was on days like this that surveyors in charge recognized that their surveying duties on line were the most rewarding part of their job. The organization, keeping of records both for the survey and commissary, hiring, patching cuts and bruises, arranging for repairs to 'autoboggan engines', etc. in the bush was tiring and took it's toll on the surveyor.

This survey experienced some problems in keeping the axemen due to troubles at home, infections, homesickness, urge to go trapping, etc.

CONTROL SURVEYS

A township outline survey was carried out in Townships 69 to 76 and Ranges 3 to 6 E.P.M. between January 25th and March 25th, 1965. The party surveyed 53 miles of new line and retraced another 3 miles.

Survey Party

Chief of Party	T.H. Stevens, M.L.S.
Assistant	R.Q. Bastin, M.L.S.
Leveller	A. Rezansoff
Pilot Transitman	G. Tokaryk
Head/Rear Chainmen-500 Link	B. Bednar/A. Pitura
Head/Rear Chainmen-200 Foot	G. Norman/B. King
Picketman	S. Rarta
Mounders	G. Beard, B. Eckert
Rodman	D. Kumhyr
Cook	K. Healey
Cookee	L. Nepinak
4 Axemen	

Observations from the Surveyor's Report—

Considering the short season, there seemed to be more than the usual injuries and sickness on this survey. The weather was colder during longer periods than some previous winters, so possibly this had some effect.

In total, five men left the camp; of these, four with injuries or illness. Another four men lost time in camp with sickness or injuries. One of the men who left due to illness was the cook. This meant the camp was without a cook for a week. The party chief and the cookee were able to prepare the meals for this period.

The rock drills and power saws were a source of trouble for most of the winter. The main problem seemed to be a combination of poor mechanical repair, aggravated by a shortage of skilled operators.

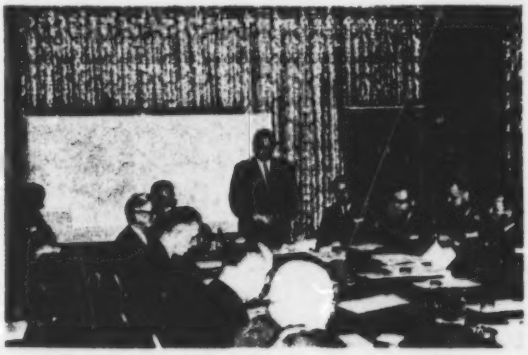
The four axemen were usually able to complete a mile of line each day unless they encountered one of the areas of heavier timber which were quite common. At this time the only satisfactory method of maintaining a reasonable rate of progress was to use a light power saw. A standard chain saw would cut line very nicely, but it was difficult to find an operator. Cutting line on snowshoes in deep snow is arduous and dangerous work. Those few who are able to do the work generally don't think it is necessary to work that hard. However, when an ultra-light saw (fifteen pounds) was offered, the situation regarding operators changed. This saw could be used all day without undue fatigue.

A new system was improvised, whereby the axemen cut out a narrow line down the center and cut out all of the small trees. The saw operator then came behind and widened out the cut for the necessary skyline. This saw was taken out on line every day it was anticipated there would be a need for it.

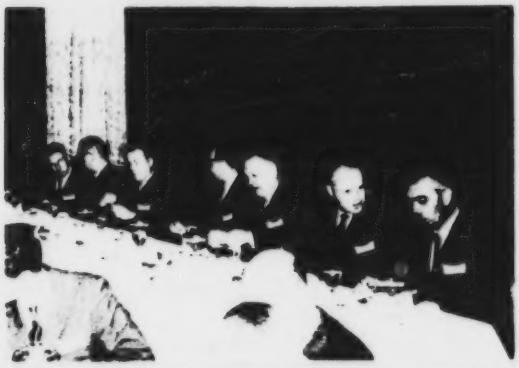
Office Work

MANITOBA HOSTS MEETINGS

The Canadian Permanent Committee on Geographical Names, on which the Director of Surveys is the Manitoba Representative, met for the first time outside Ottawa in Winnipeg on October 5th, 1964.



Mr. S.G. Gamble addressing the Canadian Permanent Committee on Geographical Names.



Head table at a luncheon, during the meeting of Federal and Provincial Survey Officials hosted by Hon. Sterling R. Lyon on behalf of the Department.

(L. to R.): D.W. Thompson; S.G. Gamble, Director of Surveys and Mapping Br. (Fed.); Hon. S. Lyon, Minister of Mines and Natural Resources; J.S. Anderson, Deputy Minister; Hon. W.M. Benidickson, Minister of Mines and Technical Surveys, Ottawa; Col. M.C. Sutherland-Brown, Director of Operational Services and Surveys, Ottawa; J.H. Bean, President, Association of Manitoba Land Surveyors.

MAPS AND MAPPING

Several maps were prepared for ozalid printing and they included the 8 mile Base Map, 67 Township Grid Maps and 45 Base Maps at a scale of 1½ miles to 1 inch.

From the annual report:—*The Federal Government has completed additional mapping in the National Topographic Series and maps now available are as follows: 1:25 000—55; 1:50 000—366; 1:250 000—47; and 1:500 000—complete coverage....*

....the Interlake ARDA project area map was completed with all necessary overlays; municipal boundaries, land use, wildlife areas and services and submitted for publication....

Special drafting services were provided on a continuing basis for various branches of the Department. These included forest inventory details, hunter safety and trapper education sketches, as well as a variety of special assignments for the Conservation Education Section....

PHOTO-MAPPING (SQUARE MILES)

ACTIVITY	1960/61	1961/62	1962/63	1963/64	1964/65
Slotted Templet Control	3900	6756	11,444	4043	2376
Sketch-mastering	1310	8608	14,767	1008	1190
Mosaic Construction	4339	5772	10,992	14,559	3960

1965/66

Field Work

MANITOBA-SASKATCHEWAN BOUNDARY

Three sections of the boundary were to be surveyed this season being (1) through Townships 45 to 48 inclusive, (2) through 58 to 60 inclusive, and (3) through Townships 79 to 83 inclusive and part of 84.

All personnel lived in cabooses during the survey of Sections One and Two while Section Three was typical of other boundary surveys-tenting.

Caboose camp crossing the Red Deer River, township 46, March 7, 1966.

Ground transport was used during sections one and two consisting of a bombardier, two sleeping cabooses, a dining caboose, and two freight sleighs drawn by a crawler tractor equiped with a bulldozer. Tractors for sections one and two were supplied from The Pas by O. Herman and G. McLean, respectively. An Otter aircraft piloted by M. Zikman and serviced by R. Fitzpatrick provided the transportation for Section Three.

Delays in Section Two, such as the tractor not being available for 25½ days, caused the winter survey program to fall short of its objective as only a portion of Section Three was surveyed.

D. Crandall advising his assistant that a new station is ready for line production.

Survey Party

Chief of Party	D.W. Crandall M.L.S.
Assistant for Sec. 2	R.Q. Bastin, M.L.S.
Assistant for Sec. 1	M.Q. Foster, M.L.S.
Head/Rear Chainmen	
500 Link	G. Norman/L. Reder
Head/Rear Chainmen	
200 Foot	M. Drouin/H. Orvis
Pilot Transitman	J. Yakusik ,
Mounders	W. Eckert/R. McAuley
Picketman	A. Carriere
Axemen	L. Carriere/D. Morin
Cook	E. Madsen
Tractor Operators	
Section 2	G. McLean
Section 1	L. Heinz

Observations From the Surveyor's Report—

The men listed below were hired to increase our establishment for Section Three and to replace the men from Cumberland House, Sask., who left the survey after completing Section One.

Assistant	*A.C. Roberts, M.L.S.*
Head Chainman	*B. Larson*
Axemen	*R. Custer**
	*S. Bear**
	*A. Bear**
	*I. Merasty**
	*P Bighetty**
	*R. Natweyis**

* *Saskatchewan Personnel*

Mr. Roberts arrived on March 31st to replace Mr. Foster who had received a bad cut on his ankle and had to return to Winnipeg.

PHOTOS FROM OTHER SURVEYS
Porcupine Forest Reserve Survey

Porcupine Forest Reserve Survey

Survey Camp—Bell Lake

In the cook caboose, R. Ward checks the coffee

Axemen at the head of the line

Mound and pits being established to mark survey post location.

A typical scene during this survey

A. Rezansoff levelling near Delta Waterfowl Station

Office Work

MAPS AND MAPPING

The major mapping projects published were the Base Maps for the ARDA Interlake Area Study, Periphery Duck Mountain Area and depth charts for Athapapuskow Lake.

AERIAL PHOTOGRAPHY AND PHOTO MAPPING

There were 2,736 square miles of mosaics prepared for forest inventory in the Interlake, Porcupine Provincial Forest and Lake Winnipegosis regions from 1964 photography, and an additional 6,516 square miles were prepared from 1962 photography for ARDA in an area of Lake Winnipegosis and Lake Manitoba, all at a scale of ¼ mile to 1 inch. Mosaics were prepared from the 1954-55 photography in an area around Playgreen Lake, covering 3 996 square miles.

1966/67

Field Work

MANITOBA-SASKATCHEWAN BOUNDARY

Summer Survey

A boundary monument placed by R.A McLellan in 1936 stood in the way of the construction of a proposed iron ore concentrator at the Hudson Bay Mining and Smelting Plant in Flin Flon. From September 11th to 14th, 1966, D.W. Crandall headed the survey party of three men to erect a permanent monument south of subject to destruction.

L. Brooks constructing forms for concrete base.
Note: Monument subject to destruction below window.

Winter Survey

Between January 31st and March 6th a party of 18 men surveyed 25¼ miles of the boundary and retraced 7 miles of the 2nd Meridian West approximately 100 miles north of Flin Flon.

Survey Party

Chief of Party	D.W. Crandall, M.L.S.
Assistant	E.B. Flower, M.L.S.
Head/Rear Chainmen 500 Link	B. Larson, M. McAuley
Head/Rear Chainmen 200 Foot	J. Knight, J. Whitehead
Pilot Transitman	S. Gren
Head Mounder	V. Krassilowsky
Mounder	W. Beard
Picketman	N. Halcrow
Axemen	D. Ballantyne*
	J. Thomas
	I. Merasty*
	A. Bear*
Cook	G. Smith*
Bull Cook	D. Jones
Pilots (Alternating)	G. Mason, M. Zikman

*Saskatchewan Members

Portion of crew: L to R:D. Crandall, D. Jones, G. Mason (Pilot), G. Smith, B. Larson

V. Krassilowsky and W. Beard drill a rock for dynamite to obtain blast material to construct a rock mound

Monumental Ceremony

At a brief ceremony on February 23rd near the shore of Kamachawie Lake, 100 miles north of Flin Flon, the survey monument marking the completion of Manitoba's Interprovincial Boundary surveys was dedicated by Hon. Gurney Evans, Minister of Mines and Natural Resources.

(L to R): A.I. Bereskin, Boundary Commissioner (Sask.); Hon. G. Evans, Manitoba Minister of Mines and Natural Resources; D.W. Crandall, Chief of Party; R. Thistlethwaite, Chairman of Man.-Sask. Boundary Commission representing Canada; E. Gauer, Boundary Commissioner (Manitoba).

(L to R): M. Zikman, Pilot; W. Mair, Deputy Minister; D.W. Crandall; M.J. Gobert, Assistant Deputy Minister; B. Flower; during a dinner for the officials where 'ice cream' was also served.

The official party in camp on Roderick Lake

(L to R): W. Mair, Deputy Minister; Hon. G. Evans, Minister; M.J. Gobert, Assistant Deputy Minister; E. Gauer, Director of Surveys; R. Thistlethwaite, Surveyor General of Canada; D.W. Crandall and Jim Richards, Director of Mines Branch.

It had taken ninety years to survey the province's boundaries. The many interruptions to the project had included: two world wars, the transfer of the natural resources to the province in 1930 with the resultant organizational adjustments, the lack of funds due to many causes, and the problems of maintaining sufficient professional and technical staff to execute all the work of the branch and the surveys of provincial boundaries. It is interesting to note that 847 miles of the 1931 miles of provincial boundary were surveyed after 1946.

CONTROL TRAVERSE SURVEY— CORMORANT LAKE AREA

A crew of seven men led by T.H. Stevens, traversed 132 miles of portions of Talbot, Moose, Clearwater and Cormorant Lakes from March 7th to April 7th, 1967.

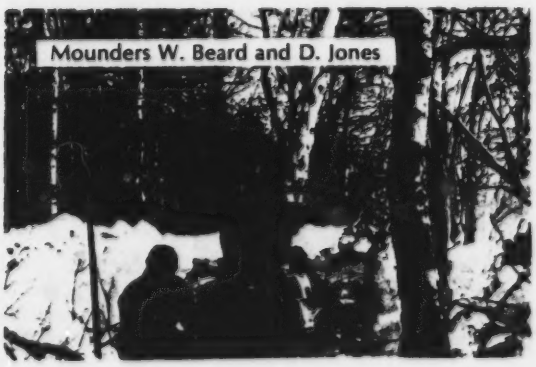
Observations from the Surveyor's Report—

The purpose of the survey was to provide control for aerial mapping. Deflection angles were read with the Wild T2 Theodolites and distances were measured by Tellurometer. A Tellurometer traverse had not been run before by this Branch and various procedures and techniques were developed as the survey progressed.

The following system was devised and found to function effectively. The Chief and one man continued in the lead and selected a suitable location for each station. Upon arriving at the new point, a picket was put up immediately and the Tellurometer assembled and switched to "warm up". While waiting for the instrument to reach operating temperature, the time was spent in tying in monument or photo control points.

B. Larson and his equipment

The instrument man at the previous station would read the deflection angle at this time. His Tellurometer would also be on "warm up". Sufficient time would be allowed for the instrumentman to complete the angle measurement. Both Tellurometers were then placed over the points and directed toward the other station. Radio control was established and any local problems discussed via radio. The distance was then measured. If poor visibility or other factors interfered with the measurement of angles, the picket was replaced after the distance was measured. When a proper reading of the angle was completed, the men would move ahead.



Mounders W. Beard and D. Jones

During the winter there was considerable difficulty at many stations in getting a suitable reading. This appeared to be caused by many factors, including low temperatures, high winds, drifting snow and reduction of line of sight due to the earth's curvature. Generally, points were selected on the shore to gain optimum height for visibility. However on the flooded shorelines, there sometimes was no high ground. When both sets were on or near ice level, three miles was the maximum spacing for stations. The centre point would be several feet higher due to earth curvature and this point would have several feet of snow over it. Snow has a high rate of absorption of radio waves and adds to the difficulty of long measurements.

Some of the men and their equipment
(L—R) B. Larson, N. Halcrow, T.H. Stevens

At about twenty below, with a strong wind, the instruments take at least half an hour to warm up. At this temperature it is more difficult to obtain consistant readings. Possibly the internal temperatures are not maintained. The operator also finds it more difficult to maintain a sensitive touch which has some effect on the results. Standing for an hour, facing a twenty mile an hour wind across a lake at twenty below, has a definite cooling effect on operator and machine.

OTHER MAJOR SURVEYS

....Control surveys for forest inventory mapping, using a Tellurometer for distance measurement covering portions of the north shore of Atikameg Lake, Cormorant Lake and Moose Lake, totaling 150 miles of traverse, was made during the latter part of the winter.

During May and June, a Tellurometer traverse of 50 miles, covering part of Moose Lake and control on Birch Island in Lake Winnipegosis was completed, using a helicopter for transportation.

The contour leveling of part of the southern portion of Lake Winnipeg, between Selkirk and Washow Bay...was executed mainly by university students with suitable background training or experience, and supervised by a staff surveyor. The bulk of the work consisted of contour, cross section leveling, with a substantial number of

vertical control points obtained at the same time for the control of contouring by the Wild A8 Autograph. This work was confined to the summer mounths.

Vertical and horizontal controls for precise mapping, using the Wild A8 Autograph, involved the identification and ground measurements, both vertically and horizontally, of points preselected on aerial photographs and covered the following work:

—Ten Indian Reserves abutting on Lake Winnipeg were completed during the winter months, involving the establishment of elevation values at each Reserve by means of simultaneous water transfers from previously established geodetic bench marks suitably located for accurate transfer across the lake.

—Four areas which required contour mapping for the planning of recreation areas were the Turtle Mountain Forest Reserve, Spruce Woods Forest Reserve, Grand Beach Provincial Park and Setton Park near Carberry.

—The survey of a mill site near Arnot on the Nelson River, and a plant site near The Pas, as required under the agreement with Churchill Forest Industries (Manitoba) Limited were completed.

Office Work

L.S. Brooks became responsible for field office records, checking plans and calculations and providing survey data, as requested, from both within and outside the department.

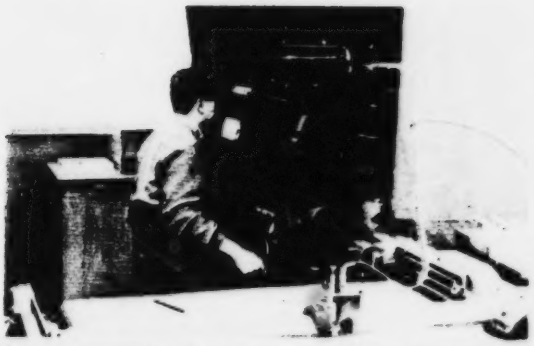
MAPS AND MAPPING

In addition to overprinting and publishing several of the 8 and 20 mile base maps, staff prepared 9 tower maps, 13 depth charts, 230 Forest Inventory Maps (¼ mile to 1 inch), and an Interlake Map for the Fund for Rural Economic Development (F.R.E.D.) for other branches.

AERIAL PHOTOGRAPHY AND PHOTO MAPPING

Large slotted templet laydowns were completed, totaling 15,516 square miles at a scale of 1,320 feet to 1 inch in the vicinity of Lac du Bonnet, The Pas, Cedar Lake and Reed Lake.

Eighteen projects were completed on the Wild A8 Plotter drawn at a scale of 500 feet to 1 inch with 5 foot contours. These jobs included work for the Department of Tourism and Recreation— Parks Branch, Department of Highways—Land Surveys, Department of Urban Development and Municipal Affairs— Municipal Planning Branch, and Department of Mines and Natural Resources—Surveys Branch.



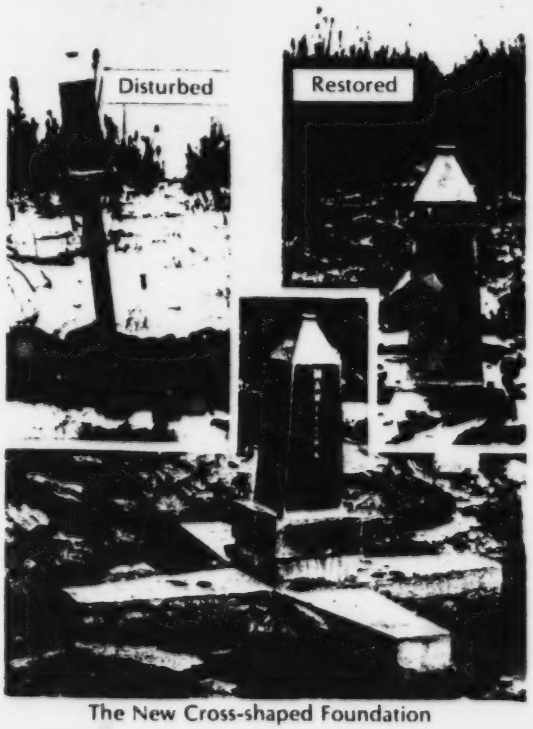
Photogrammetrist, B. Moore operating the WILD A8 Autograph (Stereo Plotter)

1967/68

Field Work

BOUNDARY MONUMENT RESTORATION

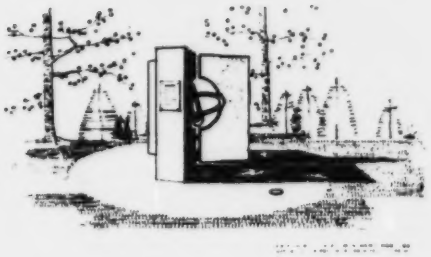
Mr. A.D. Selly, D.L.S. was conducting a Geodetic Triangulation Survey during the summer of 1966 when he found the monument at the corner of Manitoba, Saskatchewan and the Northwest Territories disturbed by frost action. Arrangements were made to re-establish the monument during his 1957 triangulation survey. On June 7th, 1967 the concrete forms were removed, the aluminum obelisk and stone mound replaced.



The New Cross-shaped Foundation

Centennial Survey Monument

1867 1967



DEDICATION

CENTENNIAL

SURVEY

MONUMENT

June 21 1967

CENTENNIAL SURVEY MONUMENT

GEOGRAPHIC CO-ORDINATES

Latitude 49° 53' 15".708 N Longitude 97° 08' 56".968 W

MEASUREMENTS

Winnipeg to Ottawa	98° 56' 03".5 Azimuth	1,043.210 Miles
Winnipeg to Toronto	110° 19' 44".8 Azimuth	942.912 Miles
Winnipeg to Regina	279° 23' 51".8 Azimuth	333.589 Miles

Program

Dedication of Site
for
Centennial Survey Monument
1:30 P.M. C.D.T. June 21st 1967.

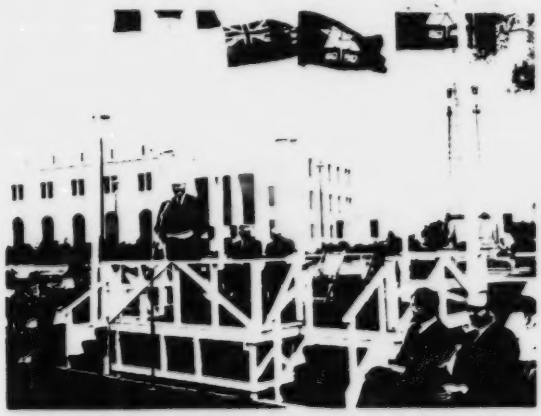
Introduction Address
Hon. Howard [illegible]
Min. Dept. of Public Works

Dedication Address
Hon. Survey Evans
Min. Dept. of Mines & Nat. Res.

Placement of Bronze Survey Post
Hon. Survey Evans

Address on behalf of The Assn. of M. L. S.
[illegible] Pollock [illegible]

Reception for Official Party -
Rosewood Room. Mail Hotel.
Host: Assn. of Man. Land Surveyors.



(L to R)—On the speakers' platform Hon. G. Evans, Mr. A. Pollock, Hon. S. McLean, Q.C.

Dedication Address by the Honourable G. Evans, Minister of Mines and Natural Resources.

The Centennial Survey Monument to be completed on this site will serve a dual purpose. It will commemorate the considerable contribution by surveyors during the past 100 years; from the early surveys in the Red River Settlement, through the immense task of subdividing the prairies ahead of the persistent wave of settlers, to the present day urban communities, super-highways and northern development. It will also serve as a symbol to mark a transition into a new era of enlightenment and at the same time mark a precise datum point in a key location for practical future reference.

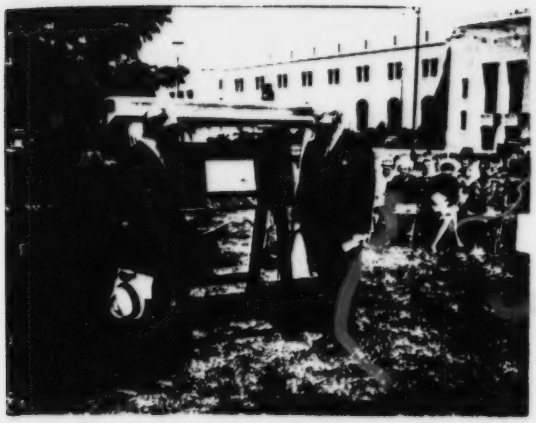
The surveyor of the past, by employing diligent measurements and by leaving well defined survey monuments, contributed a great deal to the orderly settlement of our province and the quiet possession of land which is a cornerstone of our democratic way of life.

What is known as the Manitoba Act, which provided for the establishment of government in the Province of Manitoba when Her Majesty the Queen might be pleased to admit that Province into the Dominion of Canada as provided for by the British North America Act of 1867, became law on the 12th of May, 1870. Section 32 of that Act recites in part as follows:
"32. For the quieting of titles, and assuring to the settlers in the Province the peaceable possession of the lands now held by them."

These surveyors who evolved and laid out this simple and yet efficient system of survey known as the Township System, paved the way for the location and development of our natural resources.

The techniques of surveying had changed very little over the past 100 years. However the "push button" age has arrived and the surveying profession is moving now into a period of transition. The introduction of electronic distance measurement, gyroscopic directional measurement, electronic computers and the rapidly expanding science of photogrammetry are revolutionizing the ancient profession of surveying.

The Advisory Council on Cadastral Surveys, a group of senior survey authorities from federal and provincial government departments, concluded last October in Victoria that the circumstances demand national observance. These men are principally concerned with surveys relating to administrative boundaries, property ownership and control surveys and are keenly aware of the benifits to be derived from current technological developments.



Mr. E. Gauer and Hon. G. Evans unveil the display showing the plaques and an architect's perspective of the proposed monument.

This monument, along with all the others being dedicated at this same time and date, will commemorate this past one hundred years of surveying as well as herald in a new era in Canadian land surveying.

I now place this survey post as part of this dedication.

Hon. G. Evans places survey post in the concrete pad which will support the Centennial Monument. Mr. Pollock and Mr. Gauer standing to his left and right respectively observe the placement.

A view of the proceedings from another perspective.

Hon. G. Evans and A.C. Roberts at the site of the monument upon its completion.

The Centennial Survey Monument—The three main columns are precast concrete with a rough surface and the two rings representing the equator and the Principal Meridian are made of stainless steel. The plaque on the left (inset) in English and French is attached to two columns while the plaque on the right is attached to the remaining column.

MANITOBA-SASKATCHEWAN BOUNDARY

The retracement of 118 miles of the boundary originally surveyed in 1880/81 (88 miles) and 1906 (30 miles) was conducted by a party entirely from Manitoba between June 19th and November 24th.

Survey Party

Chief of Party	D.W. Crandall, M.L.S.
Assistant	M. Pelletier (June 19th to August 15th)
	B. Bray (balance)
Head Chainman	S. Gren
Rear Chainman	M. McAuley (June 19th to July 15th)
	D. Jones (balance)
Axemen	D. Jones (June 19 to July 15th)
	L. Jones (balance)
	W. Beard

From November 20th to 22nd T. Stevens and B. Bray took independent tellurometer distance readings along the entire retraced portion.

D. Jones fires a projectile from a mortar for line sighting.

B. Bray taking a tellurometer distance reading

CONTROL SURVEYS

Three control surveys were made in the vicinity of Playgreen, Kiskitto and Kiskitogisu Lakes—148 miles; along the cleared transmission line north from Grand Rapids—49 miles; and in an area including Sherridon, Burntwood Lake and Kississing Lake—185 miles.

These traverses were completed using a tellurometer for lineal measurement, a one second theodolite for angular measurement and astronomical observations for azimuth; two-way radios to expedite progress; helicopters for transportation and pocket calculators to aid in reduction of measurements. All measurements were checked by closure and permanent-type monuments were erected for future use or extension.

Some Details on the Sherridon Area Survey

A party of ten men led by T.H. Stevens, surveyed a total of 185 miles of mapping traverse from February 26th to April 1st, 1968.

A Departmental cabin in Sherridon became home base with several advantages over tent camps, including: a saving of time and expense in camp moves, and the availability of hydro which supplied power for the helicopter engine heater, an Air Service radio system and charged the Tellurometer batteries. In addition, the men appreciated the ease of supplying the camp and the convenience of mail and telephone service. A Beaver aircraft and a G-4 Bell helicopter were used for transportation, and incidentally, the traverse survey was the first where a larger helicopter was used.

Observations from the Surveyor's Report—

As the primary purpose of this traverse was to gain photographic control and there were plans to re-photograph the area immediately after the survey, a series of targets were set out on the traverse.

Each station was marked with a stone mound about five feet across, a plywood target about four feet square and by some cutting in the surrounding bush. The stone mound is about three feet high and is painted white in cases where the color of the mound does not contrast with the base rock.

I. Bowman at survey station No. 32 showing cut line (just enough for line of sight to next station).

Trees surrounding each plywood target were cut down so the target would not be hidden or shadowed by the trees. This resulted in the target being located in a small clearing which would aid in identifying the point in the new photos.

Plywood targets are placed on a flat rock within the area of the stone monument. There is a layer of brush under the target to provide a contrast.

Survey Station No. 25 showing sun shade and plywood target.

Lake Winnipeg Contour Levelling

Wm. Krasnikoff records readings as levels are determined during the survey to establish contour mapping around the southern shore of Lake Winnipeg.

Office Work

L.S. Brooks became responsible for field office records, checking plans and calculations and providing survey data, as requested, from both within and outside the department.

MAPS AND MAPPING

In addition to overprinting and publishing several of the 8 and 20 mile base maps, staff prepared 9 tower maps, 13 depth charts, 230 Forest Inventory Maps (¼ mile to 1 inch), and an Interlake Map for the Fund for Rural Economic Development (F.R.E.D.) for other branches.

AERIAL PHOTOGRAPHY AND PHOTO MAPPING

Large slotted templet laydowns were completed, totaling 15,516 square miles at a scale of 1,320 feet to 1 inch in the vicinity of Lac du Bonnet, The Pas, Cedar Lake and Reed Lake.

Eighteen projects were completed on the Wild A8 Plotter drawn at a scale of 500 feet to 1 inch with 5 foot contours. These jobs included work for the Department of Tourism and Recreation— Parks Branch, Department of Highways—Land Surveys, Department of Urban Development and Municipal Affairs— Municipal Planning Branch, and Department of Mines and Natural Resources—Surveys Branch.

Retirement—H.P. (Pat) Baldock

On October 31st, 1967, H.P. (Pat) Baldock retired after a career of 46 years in survey related work. His valuable contribution is recognized here by some statistics:

1921 to 1930—In 1921 while working for the survey firm Chataway, Walker and Bayne, Mr. Baldock was loaned to Mr. H.E. Beresford, then Inspector of Surveys, Winnipeg Land Titles Office (W.L.T.O.), for a few days to help him clear up some problems in the Parish of Baie St. Paul. For the next ten summers he was a surveyor's assistant for that office.

1931 & 1932—Surveyor's Assistant W.L.T.O. (summer) and Good Roads (Winter)

1933 & 1942—Surveyor's Assistant with the Surveys Branch retracing parish lot surveys in the summer and conducting river traverses in the winter.

1943 to 1952—Surveyor's Assistant with the Surveys Branch.

1952 to 1967—Office Engineer, Surveys Branch. One responsiblity was the examination of mining claim plans which in 1959 reached an all-time peak of 2500 plans during mineral exploration in the vicinity of Thompson. He was also responsible for establishing the first card file for official geographical nomenclature.

(L to R) Hon. G. Evans, Minister; Ivy Baldock; H.P. (Pat) Baldock; H.E. Beresford; E. Gauer.

NOTE: On December 1st, 1983 Mr. & Mrs. Baldock were interviewed at their home in Morden. They were both doing fine and related many happy memories of the Surveys Branch. Mr. Baldock had a quote from Mr. Evans while placing the post for the Centennial Survey Monument: *This is the first time a politician knew exactly where he stood.*

1968/69
Field Work

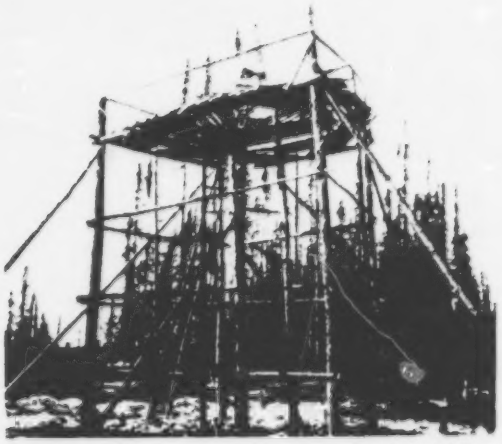
CONTROL TRAVERSE SURVEY: CROSS LAKE-BEAR LAKE AREA

From February 17th to March 17th, 1969 a survey party of eleven men including aircraft personnel surveyed the northern portion of the control traverse in the Cross Lake—Bear Lake area. The purpose of the survey was firstly, to provide the necessary horizontal control for our Branch to produce a base map for forest management and secondly, to extend the provincial control system.

Living accommodations consisted of the usual tent camp established in the Silsby Lake area. Transportation was supplied by a Beaver aircraft and pilot from the Manitoba Government Air Service rotated at two week intervals and a Bell G4 helicopter supplied under contract by Midwest Aviation Ltd. One Otter aircraft supplied by M.G.A.S. assisted in moving large quantities of fuel and food from Wabowden to camp.

Survey Party (Northern Portion)

Chief of Party	D.W. Crandall, M.L.S.
Assistant Observer and Tellurometer Operator	N.L. Peterson, M.L.S.
Tellurometer Operator	A.E. Atkinson
Surveyor's Aid	D. Jones
Mounders/Tower Builders	L. Jones, G. Landry
Cook/Bull Cook	G. Smith/W. Murray
M.G.A.S. Pilots (alternating)	F. Hanton, L. Syring, J. Blair
Helicopter Pilots/ Engineers (alternating)	P. Ziebruck, H. Dembinski L. Rianno, B. Lindall



The first such survey tower was constructed by D. Crandall and D. Jones at monument #14 or 69014. Subsequent towers were not as well fortified.

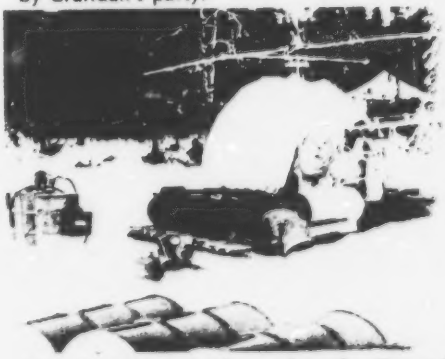
This area was not readily adaptible to the new type of control survey (tellurometers for distance measuring) due to the low relief and dense bush cover. To obtain clear sights between instrument stations, the surveyors resorted to towers, which were constructed from local timber. This inovation was developed effectively and the control was extended with a minimum of delay across difficult country.

The tower technique proved successful with all members of the party being extremely pleased in view of the extensive cutting that would otherwise have been necessary. As well, in lieu of pits and mounds, survey marker posts seven feet long were placed at all tower sites to mark the brass cap in pipe. This change in procedures released the mounders for tower building duties.

(L to R) G. Landry, D. Jones, N. Peterson, D. Crandall, A. Atkinson and L. Jones

Due to a snowstorm this crew except for Mr. Peterson spent the night in the bush in -30° weather with no provisions other than their clothes, matches, axes, a chainsaw, two pieces of chocolate and the will to survive. The men built a shelter and had a fire but did not get any sleep. The Beaver aircraft picked them up at 7:30 AM and needless to say they were given the day off.

On March 17th, M.Q. Foster and his technical staff arrived to continue the survey and their arrival coincided with the camp move to the Carrot River. They surveyed an additional 65 miles using the new techniques adopted by Crandall's party.



M.Q. Foster's Camp located on the Carrot River

Survey Party (Southern Portion)

Tellurometer and Instrument Operators	K. Baley, W. Krasnikoff
Tower Builders	D. Jones, W. Beard G. Landry
Helicopter Pilots (alternating)	W. Johnston, A. Nesbaun
Aircraft Pilot (used intermittently)	L. Syring
Cook/Cookee	G. Smith/W. Murray

MANITOBA-SASKATCHEWAN BOUNDARY MONUMENTATION

The monumenting of the previous year's retracement from township 1 to 18 inclusive didn't begin until the week of November 7th due to delays in receiving the precast monuments. Subsequently only monuments 2 to 7 were placed before freezing temperatures forced the party to disband for the season. [Several of these monuments were replaced in 1969/70 due to frost damage]

The party, organized under the direction of Mr. E. Gauer, Boundary Commissioner for Manitoba, consisted of D.W. Crandall, Chief; A.E. Atkinson, Assistant; and three monumenting crew members—D. Jones, L. Jones and W. Beard.

Office Work

MAPS AND MAPPING

The production of additional topographic maps and nautical charts had a 'snow-ball' effect on the demand for similar maps in other areas. Complete coverage of the whole province became available in the 1:250 000 as well as the 1:500 000 scales of the National Topographic Series maps.

Special maps prepared included: 32 contour maps adjoining Lake Winnipeg, 31 oil well location maps for Mines Branch, 18 base maps of Registered Trapline Areas, 9 lake depth charts, and maps of Wabowden and Bissett.

AERIAL PHOTOGRAPHY AND PHOTO MAPPING

The number of photographs loaned from the library increased from 22,000 in 1967/68 to 60,000 in 1968/69.

Slotted templet laydowns comprising 11,340 square miles at a scale of 1,320 feet to 1 inch, were completed. Thirteen projects were completed on the Wild A8 Stereo Plotter for Surveys, Lands, Water Control and Conservation Branches.

1969/70

ORGANIZATIONAL CHANGES

The annual report sums up the organizational changes in the branch:

The Surveys and Mapping program has been changing over these past years due to new techniques, new equipment and increased demand for services.

The Branch operates under four main divisions, each contributing a share to the end product be it a map, plan or other informative document.

These divisions or sections were Administration, Field Work, Drafting/Cartography and Photogrammetry (For consistency the subheadings Office Work and Field Work are used for this year).

Field Work

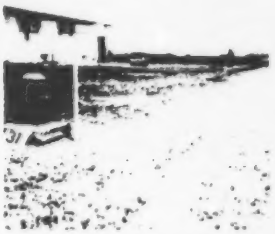
MANITOBA-SASKATCHEWAN BOUNDARY MONUMENTATION—SUMMER SEASON

The crew mentioned under this heading in 1968/69 re-grouped on May 26th with L. Kupchinski (Saskatchewan Surveys Branch) replacing L. Jones.

A two ton van was again rented to carry the concrete mixing equipment and to transport the precast monuments from Winnipeg to the boundary.

The survey bases were Melita, Reston and St-Lazare.

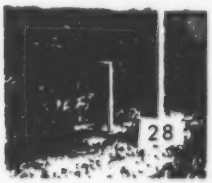
A. Atkinson makes an observation



Obelisk, Monument 31, Township 6; road allowance is used as farmer's yard

Type #1

Type #2



Type #3

Type #1:

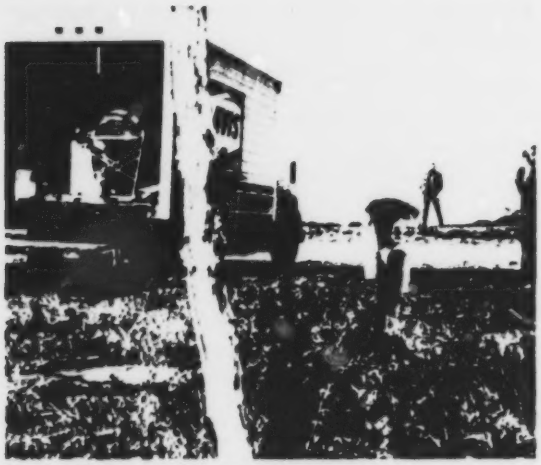
Low type, 10 inches high with pedestal portion precast placed on true boundary. Average interval of one and one half miles with maximum interval not exceeding two miles.

Type #2:

High type, 20 inches high with pedestal portion precast placed on the true boundary at or near the North boundary of a township. Average interval of approximately six miles.

Type #3:

Reference type, four and one half feet high, completely precast placed on opposite sides of the boundary at a distance of 46.20 feet where a constructed road exists. Average interval of one and one half miles.



Crew placing a reference monument

Note:
Monumentation through townships 19 to 26 was completed under the direction of Mr. J.H. Webb, S.L.S. using Manitoba and Saskatchewan Surveys Branch Staff.

MANITOBA-SASKATCHEWAN BOUNDARY RETRACEMENT AND MONUMENTATION—FALL SEASON

The retracement and monumentation of 25.5 miles from the north boundary of Township 26 northward and including Township 30 was completed by the survey party consisting of:

Chief of Survey	D.W. Crandall, M.L.S.
Observer/Main Line Production	A.E. Atkinson, M.L.S.
Geodimeter Operator	L. Kupchinski (Sask.)
Pilot Transitman	D. Jones
Axeman	L. Jones
Cook	G. Smith
Bulldozer Operator	H. Bouvier

L. Kupchinski measuring a distance with the geodimeter

Observations from the Surveyor's Report:

The survey party was devided into two groups, a survey group comprised of Messrs. A. Atkinson and L. Kupchinski, who were responsible for the main line production, measurements with the Geodimeter and Tellurometer, ties to evidence along the trail line and stellar observations; and a line clearing group comprised of Messrs. D. Jones and L. Jones supported by Mr. H. Bouvier and his Caterpillar D-7 Bulldozer. The writer's work schedule alternated between the two groups in assessing evidence and assisting the line clearing party in determining the direction of the trial line....

ACCOMMODATION:

A cabin at Madge Lake, Saskatchewan, which was rented from the Saskatchewan Department of Natural Resources, provided accommodation for the survey party.

A cook trailer owned by the Manitoba Department of Mines and Natural Resources was moved to the cabin site and used for cooking and eating facilities.

A. Atkinson obtaining a vertical angle with a T2 Theodolite

Precast monuments were placed at all sites accessible by vehicle. For #159 and #160 the brass cap was cemented in pipe and mounds and pits were constructed.

CONTROL SURVEYS

Oxford House Area

A party of ten men under the direction of M.Q. Foster surveyed a 78 mile traverse in the vicinity of Oxford House from May 12th to June 13th. This was the second part of their survey which began on March 18th but was delayed due to spring breakup. Camp was set up in the Mines and Natural Resources Cabin at Cross Lake.

A Tellurometer atop a 10 foot tripod within the tower erected at station #74 or 69R074. A three man crew could erect a thirty foot tower in one day.

The survey report noted of the topography—

Station 74 to the Principal Meridian is an area of generally poor tree growth, many old burns, with a great deal of exposed bed rock, although no hills as such. This area is fairly well drained by many small creeks, with the many lakes remaining very shallow. As an indication of the shallowness of these lakes, in many of them even up to a mile wide, moose tracks are visible across the entire width. It appears that these tracks in the loose muck of the lake bottoms must remain visable for several years.

and of the photo control monuments—

This area is also to be re-photographed this coming summer with, I believe, no worry about locating these stations on the photos. All stations have wooden towers with targets nailed on top, stations 73 to 76 being a pink cloth as we ran out of the white aluminum that the rest of the stations have. An exception is station 72 which is an 80 foot fire tower. A very great help in locating these stations will be the cut line to and from the towers. Stations 63, 67, 70, 74 and 76 are monumented with M.G.S.P. in rock, all others are M.G.S.P. in pipe. All stations also have a marker post with these posts being in rock at stations 63, 67 and 74.

Kelsey and Three Point Lake Areas

These surveys oriented to forest inventory priorities were completed during the winter in the Three Point Lake and Kelsey areas, using two field parties.

A four passenger helicopter was used on this work for the first time, and proved very suitable in areas where lakes were not available for fixed-wing aircraft as support. Again, the use of towers constructed from local timber proved invaluable in the flatter areas.

Targets were erected on pipe tripods over monuments in order to perpetuate the monument position on future aerial photography and also enable monuments to be found more easily on the ground.

K. Baley taking a reading on a tellurometer set up below the monument's target erected on a pipe tripod.

(L to R) T. Shuit, L. Syring (Pilot) and K. Baley

(L to R) W. Krasnikoff, E. Kernovich, I. Bowman, L. Jones, K. Baley

OTHER SURVEYS

One field party, with a third year student in charge, obtained vertical and horizontal control for photogrammetric mapping in various areas, including a large area in the vicinity of Gypsumville as required for land use study.

Photos from a Retracement Survey—Hodgson Area

This survey conducted between April 3rd and 24th was required to delineate the boundary of the Little Birch Wildlife Management Area.

Wm. Loewen

Note: the new wooden post placed in swamp

Office Work

The transfer of the Water Control and Conservation Branch to the Department increased the need for legal descriptions for rights of way, leases and transfers, related to the Red River Floodway and the Portage Diversion.

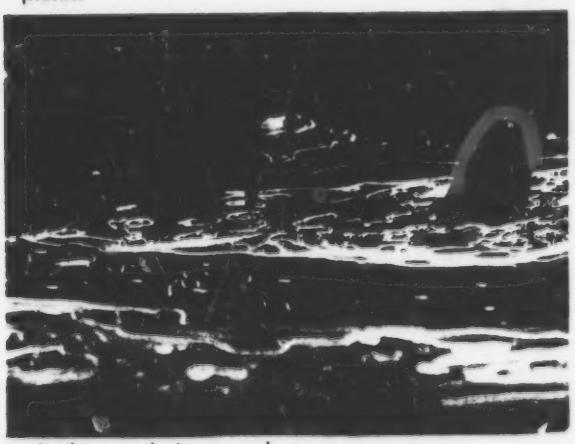
The use of the IBM 360 computer reduced the computing time and increased the accuracy of survey returns. By means of a new computer program for block adjustment of stereo models, topographical maps covering greater areas would be prepared using more limited field control. Utilizing this technique required training in programming and improved plotting machine readout methods.

MAPS AND MAPPING

The mapping in the branch was limited to that which could be produced by its draftsmen and their equipment. Prior to the 1950's maps were prepared on a single sheet of plan linen with crow quill pens for freehand lettering and ruling pens for drawing straight lines. The introduction of the mechanical inking pen with it's reservoir of continuously flowing ink, interchangeable nibs and leroy templates marked the beginning of the end for the freehand lettering era when individual drafting styles could identify the draftsman. Also, the linen which was subject to shrinking and stretching would be gradually replaced by a mylar film. In addition to being more stable this plastic film was much easier to correct and update.

In the early 1950's*, the Map Compilation and Reproduction Division of the Surveys and Mapping Branch, Ottawa, introduced map scribing—a process for producing the cartographic line work involving the removal of the surface coating (emulsion) on a coated sheet of plastic with a sharp-pointed tool. Under the new technique the average draftsman greatly increased his quality and annual output of finished maps.The instruments were simple, line weights could be well maintained and difficult symbols could be drawn with relative ease by use of custom templates. In addition the idiosyncrasies of individual penmanship were eliminated, permitting more than one person to work jointly on a single specific map.

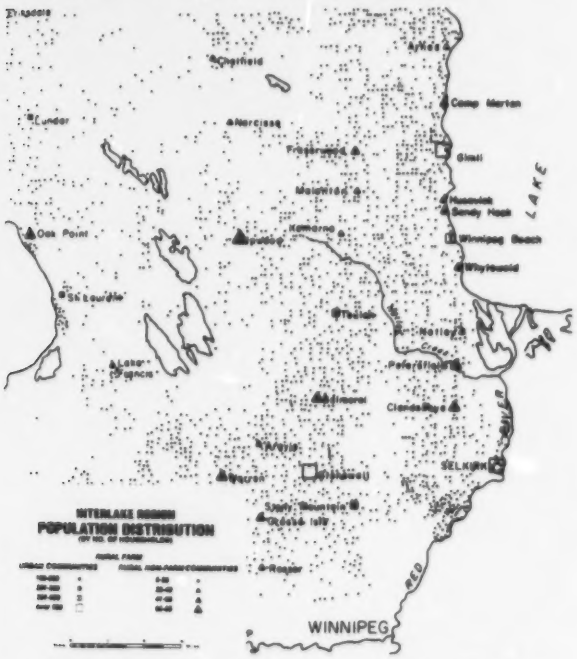
* Scribing methods were used by the military in Ottawa during W.W. 2 having been brought to Canada from England where, for years, scribing was done on glass plates.



Scribing technique used to create contours.

This scribing technique was introduced to the branch in 1960 but it would be a decade later that the first major project demonstrating its superior quality would be published. *'The Interlake Fact'* published in November 1970 as a cost shared project under the Canada Interlake FRED Agreement contained several maps and graphs. In its *Acknowledgements* is recorded:

Attractive cartography has added appreciably to the quality of this book as a reference guide. This Dimension was provided by D. Perry, and his staff of H. Sabourin, R. Gurney and J. Larcombe of the Surveys Branch, Department of Mines and Natural Resources.



The staff was busy with forest inventory mapping from tracing the control from the laydown floor to inking the final manuscripts with forest types using numbering codes.

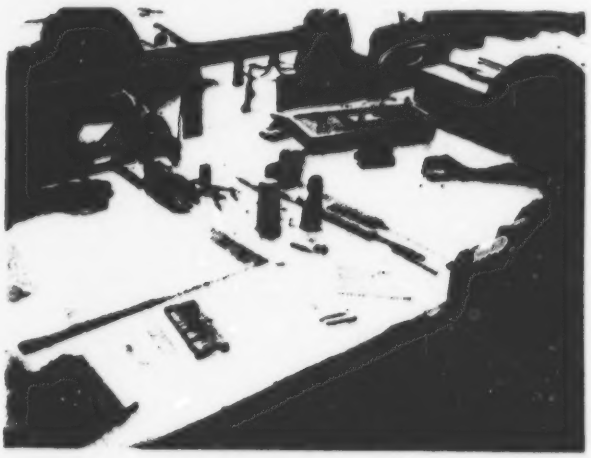
Other work included plans of survey, plans of the retracement of the Manitoba-Saskatchewan boundary and new mineral claim sheets.

AERIAL PHOTOGRAPHY AND PHOTO MAPPING

The Air Photo Library physically amalgamated with the topographical map outlet to create the joint Map Sales Office.

Orders for copies of aerial photographs and photograph mosaics were again at a high level, with the short-term loaning of aerial photographs imposing considerable pressure on the staff in order to make up orders, check on non-returned photographs and then return photographs to file for continuing use.

Several projects were mapped on the Wild A8 Autograph, stereo plotter, including the use of this machine for bridging across uncontrolled flights of photographs for mapping purposes, obviating additional and expensive field control surveys.



(L to R) Henri Sabourin and Ron Gurney preparing maps for *'The Interlake Fact'*

Retirement—Edward Gauer, D.L.S., M.L.S.

On October 31st, 1969 Edward Gauer retired as Director of Surveys. He was honoured at a banquet on October 24th by a group of 150 colleagues and friends who had gathered to show their esteem and appreciation of a lifetime of service to his native province. His service to the Branch has been documented throughout this history and is a tribute to this worthy surveyor.

THE SEVENTIES - EVOLUTION AND EXPANSION

The Seventies were, for the most part, years of expansion for the Branch witnessing several changes in organization, personnel and technology.

The increasing demand for land information and the expanding technology in the Surveys and Mapping field resulted in the hiring of graduates in Survey Engineering and Survey Technology from the University of New Brunswick and Red River Community College, respectively.

Highlights of the decade include: the International/ Provincial Boundary Monument Ceremony, the physical move to 1007 Century Street, the establishment of the Manitoba Remote Sensing Centre, the participation in the Federal/ Provincial Toponymy Field Research Project and the Manitoba Northlands DREE Program, the technological changes ranging from computers to satellites and the reorganization in 1979.

NOTE: The reader will recognize a change in the sub-headings from 'Field Work' and'Office Work' to the branch section names used during the 1970's.

1970/71

ADMINISTRATION

New techniques and management philosophies were introduced to meet the administrative needs of a modern surveys and mapping operation. The demand for land descriptions and information for legal documents remained constant, with the reduction from the completion of the Red River Floodway and Portage Diversion projects being offset by additional descriptions required for extensions to municipalities under the Municipal Act.

FIELD SURVEYS

International/Provincial Boundary Monument Ceremony

On June 25th, 1970, a ceremony was held at the Southwest corner of Manitoba to dedicate a special survey monument and plaque at the intersection of the International Boundary (49th Parallel) and the Manitoba-Saskatchewan Boundary. The retracement and monumentation of the Southwestern portion of the latter boundary by D.W. Crandall, documented in the period 1968 to 1970, paved the way for such a celebration.

Addresses covering the historical, agricultural, geographical and social aspects of the boundaries were given by various representatives, following which the Manitoba Centenniai flag was removed from the commemorative plaque.

Officials attending were: Premier Edward Schreyer; Saskatchewan Minister of Natural Resources, Hon. J.R. Barrie; International Boundary Commission Members - A.F. Lambert (Canada), R.I. Herman (United States); Manitoba-Saskatchewan Boundary Commission, R. Thistlethwaite, Chairman (Canada), W.M. Schwartz (Saskatchewan), A.C. Roberts (Manitoba); Deputy Minister, Department of Mines, Resources and Environmental Management, W. Winston Mair.

A view of the dedication ceremony on June 25th,1970

MONUMENT PREPARATION

(Above) D. W. Crandall and A. C. Roberts position the base and (right) install the commemorative plaque

A. C. Roberts makes the finishing touches to the base of the monument

Premier Edward Schreyer

The Premier's Dedication Address

"It is with a profound sense of history and an intense feeling of appreciation for the achievements of our early and later surveyors that I welcome you today to the Southwest corner of Manitoba. As we stand here, representatives of North Dakota, Canada, Saskatchewan and Manitoba, alongside the very intersection of our borders, it is appropriate to make the time-worn rhetorical references to the unfortified

border that separates Canada from the Great Nation to the South, and to the mutual concerns shared by two sister provinces of Canada as we strive to work for a common destiny. These references to International friendship and to sisterly concerns are still valid and it is to be hoped they will grow in intensity and significance as the years flow into decades and the decades add up into new centuries.

When we consider these things, the conclusion is obvious that the apparent desolation of this stretch of ground at the end of the trail we have just travelled– not far from the geographical centre of North America– must make up for its unpretentiousness with a greater significance in matters of historic and symbolic importance.

We are here today to acknowledge more than the fact that we in Manitoba are bounded on the South by friends, and on the Western Boundary by a sister province we admire. We are here to do more than express the usual platitudes about friendly hands across the border, and peaceful neighborliness of two great nations.

We are here to commemorate the fixing of the boundaries themselves, to pay tribute to the surveyors, the chainmen and their whole retinue of helpers whose arduous labors under conditions that were often adverse, defined the boundaries that shaped our lands.

The importance of fixed boundaries might be illustrated by a classic story. I don't vouch for its accuracy and I hope you will forgive me for taking a little licence. It concerns the farmer whose land was first surveyed as being in North Dakota but a later survey placed it in Manitoba. When the farmer was advised of the error, he said, 'Thank you! I couldn't stand those North Dakota winters.'

D. W. Crandall, N.S.L.S., M.L.S.,
J. H. Webb, S.L.S., M.L.S.

While the peoples of the world have been identified for centuries with particular spaces on the globe, definite lines of delineation have been in vogue for only a few hundred years. When a cairn was unveiled near the Principal Meridian near Headingley, Manitoba, in 1930 commemorating inception in 1871 of the Dominion Land Survey system of Western Canada, the system was described as "The Greatest System of Land Survey Throughout the World."

Field books and diaries of the early surveyors indicate that their achievements can truly be regarded as a triumph over nature and obstacles of every sort.

We are now standing on Township One, Range 29 West of the Principal Meridian the part of Manitoba which lies North of the International Boundary and adjacent to the Manitoba-Saskatchewan Boundary, which was surveyed by Dominion Land Surveyors William Pearce and James Gorden in 1879 and 1880.

I would like briefly to quote from the 1880 Field Book of Dominion Land surveyor James Gorden, who reported on this township where we now stand, as follows: 'The Township is composed of dry rolling prairie lands with low gravel ridges running in a general North West and South East direction, the gravel containing an admiture of limestone. The soil in the central part is a sandy loam with clay subsoil; in the North, loam with gravel and clay subsoil; and in the South clay loam soil. The land is generally of a good character. A few marshes are distributed throughout.

The South Antler Creek passes through the North and the South Antler through part of the South. They are both sluggish streams, the volume being in each about 40 to 50 cubic feet per minute.

The only timber is the small amount which is found on the banks of the South Antler Creek consisting of elm, maple, ash and cherry bush some of the two former kinds being about 15 inches in diameter.'

It is interesting to note that the cost of the original township survey in 1880 was $378.29, while the estimated cost if this township were to be resurveyed in 1970 would be about $18,000.

There were no settlers in Township One at the time of the original survey, but records show that one Joseph Dam homesteaded on the Southwest quarter of Section 36 in 1882.

The area of this township was then known as the Northwest Territory, as Manitoba's Western Boundary was about 107 miles east of the present location.

At that time we were known as 'the postage stamp province', from the shape of our limited boundaries. These were eztended in 1881 to take in extensive agricultural regions, and broadened again in 1912, North of the 60th Parallel, embracing our vigorous, developing Northland.

These are the bounds of Manitoba which this year is celebrating the centennial of its membership in the confederation of Canada, a celebration of Canada, a celebration which makes today's commemoration of boundary activity doubly significant. Even as the unveiling of the Headingley Cairn in 1930 was an appropriate event in Manitoba's Golden Jubilee Celebrations, the marking of this monument today during Manitoba's Centennial, is most appropriate.

The present Manitoba-Saskatchewan Boundary, as established in 1881, was defined as 'the centre of the road allowance between the 29th and 30th ranges West of the Principal Meridian, etc.' During the past few years, the work of retracing this boundary to fix it properly, has proceeded apace and should be completed by next year.

The monument we are here to dedicate marks this work and recalls as well the vision, courage and pioneering spirit of our early surveyors."

Hon. J. R. Barrie, Saskatchewan Minister of Natural Resources and Premier Schreyer unveil the commemorative plaque.

Legal and Control Surveys

To increase the survey capability and alleviate workload problems associated with the newly acquired responsibility for Water Resources Branch surveys, implementation plans were made to purchase short range electronic distance measuring equipment and to provide for the staff land surveyors to supervise more than one field party.

Three winter Tellurometer Control Traverses were carried out in the Gods Lake and Southern Indian Lake Areas. The practice of erecting earth or stone mounds at the sites of survey monuments was discontinued in favor of erecting fabricated legal survey marker posts. This change was a result of the introduction of these marker posts to protect the survey monuments in the Southern agricultural regions. This practice reduced the number of personnel required on surveys and at the same time removed a potential hazard as dynamite had been used in breaking rock for the stone mounds.

Survey Parties:

1. Southern Indian Lake Area (February 4th to March 16th), Party Chief: A.E. Atkinson, M.L.S., Other staff: W. Krasnikoff, M. Pierson, L. Jones

(L-R) W. Krasnikoff, L. Jones, M. Pierson

2. Hayes River/Sharpe Lake Area (February 19th to April 3rd), Party Chief: J.T. Wood, M.L.S., Other staff: R. Tanner, K. Baley/L. Penonzek, G. Miller, Helicopter Pilot/Mechanic : P. Medwiduk

(L-R) J. T. Wood, N. L. Peterson

3. Silsby Lake/Stupart River Area (February 19th to March 30th), Party Chief: N.L. Peterson, M.L.S., Other staff: I.R. Bowman, J. Taylor, O. Recunyk, Helicopter Pilot/Mechanic: W. Johnson/H. Einarson

Diary Details (from a Tower Builder's Perspective) - J. Taylor

Monday, February 15th *"Driven to Selkirk where we boarded an Otter (aircraft) piloted by John Blair. Arrived at Gods Lake Narrows approximately 14:30. Accommodation - log cabins - 4 men per - Rae Tanner, Gerry Miller, Orest Recunyk and myself. Gas heat - outdoor plumbing. Food is excellent - moose roast for supper."*

After several delays due to lack of equipment arrivals and helicopter breakdowns the crew began their job on Friday, February 19th and by Tuesday, February 23rd:

"Really good day today - left early with a beautiful clear sky and Temp.+18 (degrees Fahrenheit). Arrived at point we picked yesterday and built a 5 tier, 40' tower which Bo (I. Bowman) says is the largest he's built. We cut line for 400' to west using axes - chainsaws weren't working too well."

And when the weather was bad as on February 27th:

"Weather out, both parties in. Slept, read, played cards. Meals were our only diversion. Bowman busy making pirate costume."

Additional equipment arrived on March 1st and the two tellurometers were unserviceable. Also recorded this day were: *"...battery on Ranger (Helicopter) was dead.....both chainsaws unserviceable"*

On Monday, March 8th it was noted: *"Bowman X-rayed - nose is broken... can't get Clay - Fraser fight on the radio"...* (It was reported Mr. Bowman jumped from the helicopter and hit his nose on his knee as he landed.)

March 10th: *"Completed tower @ sta. 196 - only 3 tiers but solid with good visibility both ways. Cutting was a big operation ...Big day tomorrow"*

And tomorrow well that's another story: Got halfway to work this morning when the weather closed in - freezing rain. Weather at camp was perfect 52 degrees and sunny which made the sitting around even worse...."

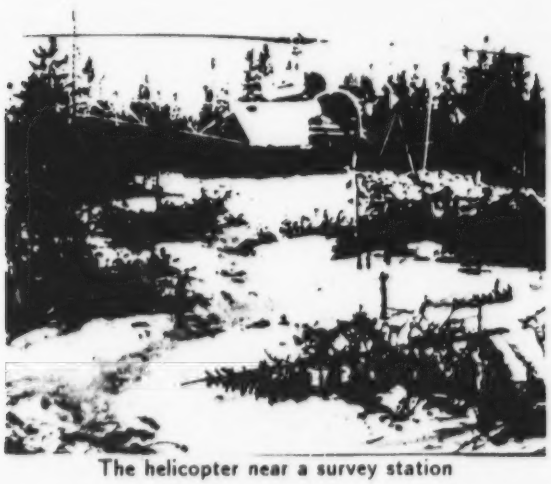
March 12th: *"Due to the atmospherics Brassey Hill appeared inverted in the sky on the way to work this morning.. Flew East to the river and snowshoed into the intersection of cuttings 2nd Meridian E. and the 18th Baseline. Found brass cap and another brass cap 2400' south."*

March 14th: *"Flew approximately 15 miles down 2nd Meridian and found Gauer's station #61 - chained 1509' S and found cap to establish line. Erected tower over Sta. 61 to tie in Brassey Hill (tower and independent tripod)."*

Modes of Transportation

March 15th: *" ...flew to Hayes River where Bo and I were dropped off. Took 20 minutes to struggle up Brassey Hill where we cut out a chopper pad.. view is panoramic - you can see forever..."*

March 24th: *"Orest and I occupy station 107 (Primeval Forest). I got distances both ways and Orest got the angle...."*



The helicopter near a survey station

March 30th: *"Working for Jim Wood...Norm departs with slipped disc.... Rollie Mathieson up to photograph photo targets."*

April 3rd: *"Went to Sta. 62 by Beaver with Larry P. (Penonzek). Took distance and angles...started packing, ready to go tomorrow."*

Other Survey Activities:

Recreation summer home lots were surveyed at Paint Lake and Setting Lakes. Lands Branch and the Department of Education accounted for the miscellaneous surveys.

CARTOGRAPHY

Forest inventory mapping accounted for a large portion of the work with 354 township maps being inked and numbered, including the tracing of control from the mapping laydown floor.

Sixty-nine plans of legal surveys made by staff surveyors were drafted for registration in the various land titles offices, with the largest number being plans of water control works.

Maps and graphs for use in the compilation of "The Interlake Fact" were prepared. This was the first major mapping project using the scribing technique and resulted in creditable maps for illustrations.

Some preparation work was completed on a 1:1,000,000 relief map of the province.

PHOTOGRAMMETRY

Slotted template laydown mapping for forest inventory and geological survey continued with some 10,260 square miles, in the area adjacent to Granville Lake, Split Lake and Burntwood River, were completed. A further 1,756 square miles in the area south of Southern Indian Lake were also completed.

A number of topographical contour maps were prepared on the stereoplotting machine, with some using the computer program for strip and block adjustment. A typical project was the mapping of a recreation area on the Pinawa Channel. Scales of these maps varied from 100 to 500 feet to the inch, with contour intervals of two and five feet.

1971/72

The Branch became known as the Surveys, Mapping and Lands Branch after the amalgamation with the Crown Lands and Forest Inventory sections in June 1971.

ADMINISTRATION

The boundary descriptions for the new City of Winnipeg Act and for the extensions to the City of Brandon were special and time consuming projects.

Approximately 300 new geographical names were approved with the majority being Manitoba World War 2 casualties applied to features in the Northwestern part of the province. They were required for the preparation of 28 new photo maps by the Federal Department of Energy, Mines and Resources.

The Map Office distributed a record number of topographical maps and aerial photos. Revenues from the sale of maps was recorded at $28,800.00.

Frances Mellen

John Klaponski

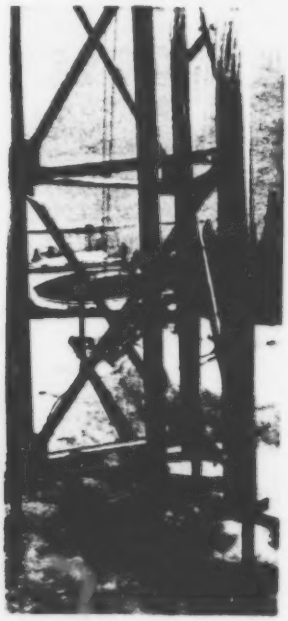
FIELD SURVEYS

Legal surveys for northern airstrips and settlements and for the Water Resources Branch were the major projects of the year.

A program of providing initial survey control in the Island lake area for forest inventory and geological mapping was completed.

New portable survey towers were used to advantage and enabled the control survey to traverse flat terrain covered with stunted spruce unsuitable for building towers.

The 40 foot tower was used in relatively flat terrain for control traverse surveys.



A portable (Lambert) tower over survey post

Island Lake Control Traverse:

Survey Party Party Chief: A.L. Hayward, M.L.S. Other Members: L. Jones, D. Barkman, R. Tanner, P. Eliuk; Helicopter Pilots: J. Creekie, P. Swift

In the office at 815 Norquay Building
(L-R) D. Kelba, I. Colek, A. Hayward

The party stayed at the Island Lake Lodge where they waited for a helicopter for two weeks. Tired of waiting around, they placed their first two stations with a fixed wing aircraft.

Stevenson Lake Control Traverse

Survey Party Party Chief: M.Q. Foster, M.L.S. Other Members: W. Krasnikoff, L. Penonzek, D. Richardson, G. Fraser; Cook: G. Smith

All members stayed at a forestry cabin except for D. Richardson and G. Fraser who stayed in a refurbished 'boat house'.

G. Fraser

'Home Sweet Home'
The refurbished 'boat house'

Other Control Survey Details

Additional mapping control was developed by planned targetting of existing survey points and by aerotriangulation (mechanical aerial photo traversing) using high level photography.

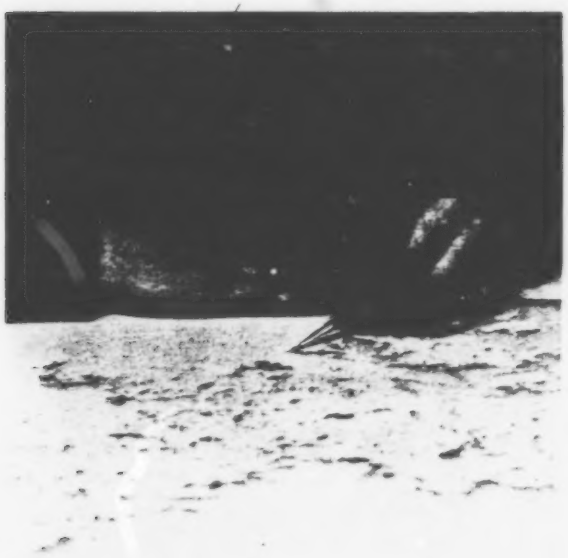
The addition of electronic distance measuring equipment, enabled more efficient deployment of field staff and contributed to the record number of field surveys completed.

CARTOGRAPHY

The forest inventory base mapping project continued with completion of 6,012 square miles. In March the 'Flight Information Map' on the new 1:1,000,000 base map was released with plans to update and reprint the map as Northern airstrips developed.

A mapping project for geological surveys included the enlargement of existing 1:250,000 National Topographic Series maps and enhancement of the topography from air photos.

A series of recreational facility maps were among the miscellaneous projects.



Removing peel-coat to create 'open windows'

PHOTOGRAMMETRY

In addition to establishing mapping control, using the slotted template laydown and aerotriangulation methods, topographical mapping on the stereo plotting machine continued with a typical project being the relocation of Provincial Road No. 315.

Technical assistance was given in preparing specifications, administering tenders and supervising a contract for detailed contour mapping fo the Lake Winnipeg South Shore Erosion Study.

Other assistance was provided for an assortment of resource projects, including the Leaf Rapids Townsite Development.

The acquisition of a 70 mm camera provided the capability to produce aerial photography at short notice. The initial project for this camera was the photography of northern settlements for planning and development including remote housing, airstrip construction, and hydro and telephone extensions. It was also used to update forest inventory mapping in areas affected by fire, clearing and construction.

Special projects for pollution detection were completed using filters and both color and black and white film.

CROWN LANDS

This section, responsible for the administration of the Crown Lands Act and for coordinating the Crown Land requirements of the various government departments and agencies, witnessed a substantial increase in northern development, northern townsites and communities, and in Manitoba Housing and Renewal projects. The land adjustment and conversion programs initiated under FRED and ARDA projects contributed to the increased role in the Interlake and other southern areas of the province.

A land file microfilming program was introduced to increase information and distribution efficiency. A preliminary review of a Central Land Registry was made whereby all lands owned by Her Majesty the Queen and held in the right of the Province of Manitoba in all government departments would be recorded in one central Crown Land Register.

FOREST INVENTORY

A summary of their completed projects in square miles includes: Aerial photography (300), Photo-interpretation (15,984), Field Surveys (11,340), Data Compilation (8,676), Area and Volume Reports (6,838), Preliminary Inventory Reports (7,887) and Township Mosaics (11,448).

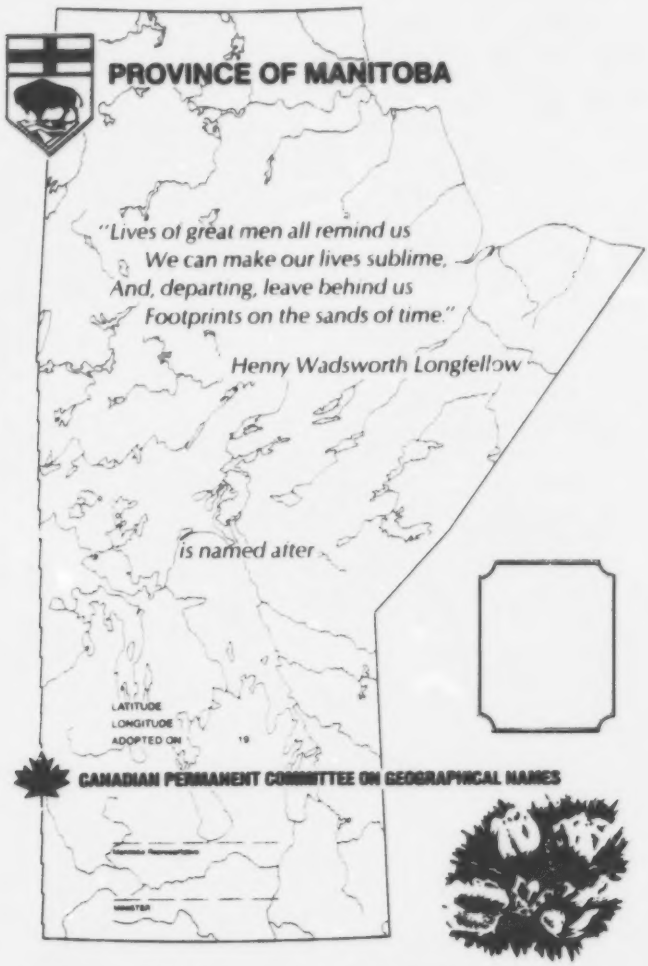
In the area now covered by field work, 4,956 sample plots were established and 32,399 trees were measured.

1972/73

ADMINISTRATION

The maintenance of geographical name punch cards for an annual up-to-date computer printout was tested and proved to be feasible.

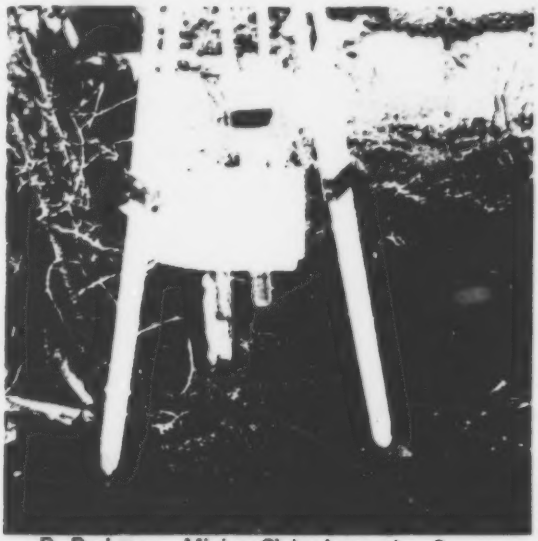
A program of providing special commemorative name certificates commenced with the majority being issued to next-of-kin of war casualties after whom geographical features had been named.


PROVINCE OF MANITOBA
"Lives of great men all remind us
We can make our lives sublime,
And, departing, leave behind us
Footprints on the sands of time."
Henry Wadsworth Longfellow
is named after
LATITUDE
LONGITUDE
ADOPTED ON 19
CANADIAN PERMANENT COMMITTEE ON GEOGRAPHICAL NAMES

Commemorative Name Certificate (Actual Size 12" X 16")

(L-R) J. Blair,(Pilot); Ragnar Jonsson; A.C. Roberts
Presentation of Commemorative Name Certificate to Ragnar Jonsson on Jonsson Island, September 2nd, 1972.

The provincial control survey program was continued during the winter months by integrating federal first order control surveys with the provincial system and extending basic survey framework in the Gods Lake area.



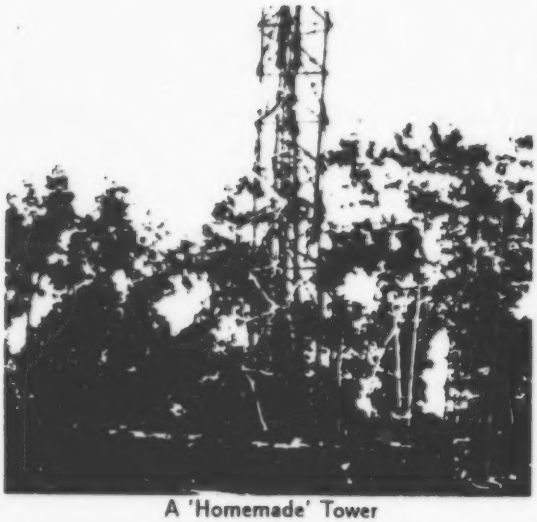
D. Barkman - Mining Claim Inspection Survey

FIELD SURVEYS

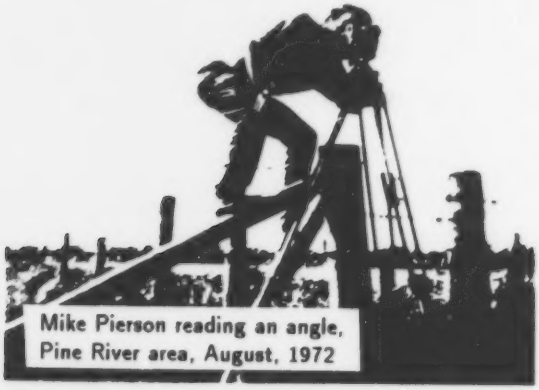
A major achievement was the completion of the backlog surveys acquired when the survey requirements of the Water Resources Branch were assumed in 1969.

The Lake Winnipeg/Churchill/Nelson River Study Board requested mapping of the Rat-Burntwood River System. Because of the time constraints involved and the lack of existing control, an airborne control system, a relatively new technique, was used and allowed the mapping to procede on schedule.

Surveying near Birnie, Manitoba
(L-R) D. Paluck (summer student), and G. Miller



A 'Homemade' Tower



Mike Pierson reading an angle,
Pine River area, August, 1972

Transportation and Accomodation

ABC (Airborne Control Survey)

The Tower Building Crew

CARTOGRAPHY

The section further developed the scribing technique and prepared two new base maps, being the City of Winnipeg (1:30,000) and the Province of Manitoba (1:1,000,000). As well, the Flight Information Map was updated.

A set of individual maps of northern Manitoba displaying geology, physiographic features, relief, wildlife, geographical names, etc. were published under the title Manitoba North Maps.

PHOTOGRAMMETRY

Sixteen tcpographical mapping projects were completed with the two largest being the inspection on the con-

tract mapping along the south shore of Lake Winnipeg and the compilation and inspection of mapping along the Rat-Burntwood Rivers.

Slotted template work declined due to unfulfilled flying contracts. The personnel normally used on this work contructed rectified photo mosaics for the Lake Winnipeg, Churchill and Nelson River Study Board on the Rat-Burntwood Rivers.

The Department of Northern Affairs requested several photographic interpretation studies on aerodrome locations and potential hazards on approaches to aerodromes along with proposed new locations and relocations of winter roads.

CROWN LANDS

There was extensive activity related to land purchase, land conversion and re-allocation programs conducted in association with the FRED and ARDA projects.

An Order-in-Council transferring the administration of agricultural leases and permits to the Department of Agriculture was prepared and passed with an effective date of April 1, 1973. Land use classification and designation remained with the Department of Mines, Resources and Environmental Management.

The microfilming of the Crown Land records neared completion as new equipment to perpetually update the records was installed.

A study of a legal land registry system was begun with the objective of setting up a Central Crown Land register system.

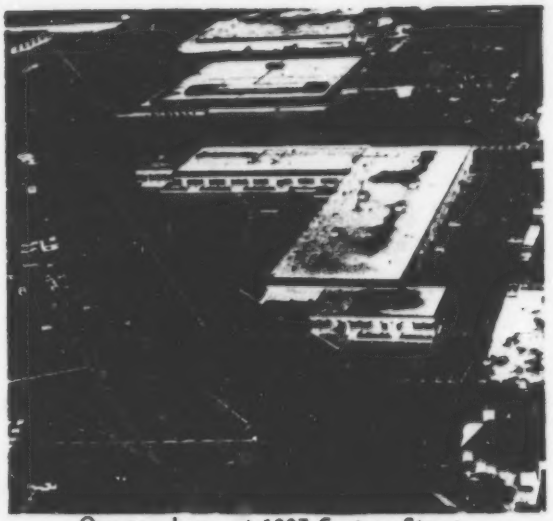
FOREST INVENTORY

Work was concentrated in the Northern Region where the field party completed sampling for the entire Churchill Forest Industries area and compilation of data, volume and area reports.

Photo interpretation and inventory reports for the Eastern Region were also completed.

1973/74

In May 1973, the Branch moved to their new location at 1007 Century Street, thereby providing the required space for the technical initiatives of the 1970's.



Our new home at 1007 Century Street

ADMINISTRATION

Besides the increase in personnel administration and the legal description requests the section saw an increase in work on geographical name maintenance. All names were key punched on computer cards and subsequently the first edition of the Annual Directory-Manitoba Geographical Names was printed and distributed.

FIELD SURVEYS

Survey control for forest inventory mapping in the Duck Mountain Provincial Park was conducted utilizing fire towers as observing platforms for making angular and linear measurements. Subsequent mathematical tests showed that the towers had the required stability to achieve the desired mapping control at a fractional cost of conventional methods.

G. Richardson working on a cottage lot subdivision survey at Grindstone Point

The surveys for recreational development, Crown Land, airstrips and subdivisions in Northern communities continued with work done in Brochet, Crane River, Cross Lake, Easterville, Grand Rapids, Moose Lake, Shamattawa and South Indian Lake. A Control Monument Location and Protection Project was conducted under the 1973 Student Employment Program (STEP). The objective was locating and marking federal government survey monuments as a measure to protect them until such time that they are integrated with the Provincial Land Survey System. The program of integrating the federal system with the provincial system was carried out in the Thompson area.

CARTOGRAPHY

In providing a mapping service to other government departments and the Branch some projects realized were:

- A revised Flight Information Map with a Supplement booklet
- A catalogue of available maps and air photos of Manitoba
- Various overlays for the 1:1,000,000 base map illustrating: municipal and local government district boundaries; school division boundaries; survey control; official regions; provincial and city electoral divisions
- 112 survey plans, 72 wild rice lease plans, 57 electoral division maps, 11 depth charts, etc.

PHOTOGRAMMETRY

The first major photo mapping program was for the Department of Northern Affairs who requested base mapping involving 64 communities consisting of 244 map sheets. This mapping at a scale of 1:2,000 showed one metre contours and spot heights, marsh areas, and certain planimetric information. A cadastral overlay was also produced showing all survey plans plus the position of sections, townships and range lines.

The computations staff provided UTM coordinates for the cadastral information, enabling the cartographic unit to plot accurately, by using a coordinatograph machine, all the necessary survey information. Finally a photo mosiac was constructed, using photogrammetric control to fit to the compilation manuscript. Both the rectified and orthophoto methods were used, depending on the amount of relief of the land shown on each map sheet. This photo mosaic was then converted into negative form and combined with the other overlays to produce the branch's first photo map series.

Such mapping was made possible with the acquisition of a Wild B-8S stereo plotter interfaced to a Gradicon digitizer with output capabilities onto either magnetic tape or punch cards for precise aerotriangulation. The digital output from the plotter when run in conjunction with the block adjustment program, allowed the section to generate control points from a minimum number of surveyed points. The digitizer, complete with digital table, interfaced to a Hewlett-Packard 9810A desk top programmable calculator for precise area, volume or distance calculations.

With the advent of digital equipment the traditional Slotted Template Laydown method underwent a radical change. A method was developed which allowed digitizing of the forest inventory photography for entry into a photogrammetric block adjustment. The result was a set of coordinates, which when plotted onto mylar, duplicated the traditional method without a template ever being produced.

In the supplementary photography program some difficulty was encountered with navigation along predetermined flight lines and tests were made using closed circuit television to aid this aspect of the work. Approximately 6,000 - 9" x 9" prints were made from the 4,300 negatives flown during the year of the Assiniboine River, numberous southern communities, Highway 75, forestry cuttings in the Duck Mountain area and near The Pas, and the Oak Hammock Marsh.

MAP OFFICE

The Map Office and Air Photo Library were consolidated into one section with an additional capability of providing ozalid prints of all survey plans as well as prints of micro-filmed plans and records. These capabilities and better parking facilities at the new location increased the demand of these services.

The practice then was to loan out photographs as and when required, for period of three weeks with provision for extension to six weeks. Any photographs damaged or retained by the borrower, at the expiration of the loan, were ordered from Ottawa at the cost of the borrower. Upon request, copies of photographs could even be ordered by government agencies, from the stored original negatives at the National Air Photo Library (N.S.P.L.), Ottawa, with a turn around period of six weeks.

REMOTE SENSING

In February a Remote Sensing Centre was established to provide a coordinating role in the use of this technology which permits the detection and study of objects from a distance without contact. The method, in which this

is accomplished, is with imagery taken from varying heights above the earth using aircraft or satellites.

Manitoba Remote Sensing Centre

The Centre acquired a Zeiss/Jena Interpretoscope, a large stereoscope with a 15x enlarging feature, two person viewing capability, and a scale matching feature allowing stereoscopic viewing of photography at different scales. Being a modern interpretation instrument it was ideal for interpretive work in forestry, geology, geography, traffic and planning.

FOREST INVENTORY

The following projects were completed during the year:

Aerial photography (20,930 square miles), base mapping (Surveys Branch) (1,450 square miles), photointerpretation (2,280 square miles), forest surveys (5,650 square miles), included the establishment of 14,383 sample plots and measurements of 93,834 trees, data compilation (5,650 square miles), area and volume reports (5,470 square miles), preliminary inventory reports (12,980 square miles), and township mosaics (1,450 square miles).

CROWN LANDS

The Crown Lands Section was transferred out of the Surveys and Mapping Branch in 1974/75 so its responsibilities and accomplishments of 1973/74 are briefly summarized here.

This section administered the Crown Lands Act by coordinating land use designations and establishing the criteria for Crown Land use; issuing leases permits, transfers, easements, etc. for the right to occupy Crown Lands, maintaining, microfilming and updating Crown Land files; and maintaining the Indian Land Entitlement and Land Exchange related to Indian Band requirements.

There was substantial activity in the F.R.E.D. and A.R.D.A. land acquisition programs and the associated land conversion and reallocation projects. Interest in recreational, residential and commercial use of Crown Land continued strong.

1974/75

ADMINISTRATION

Late in the year, the Crown Lands and Forest Inventory Sections were administratively moved to the Operational Policy and Engineering Division in the reorganization of the Department. At the same time, Surveys and Mapping Branch was moved to the Support Services Division.

The application of new geographical names to features was at an increased level to meet the requirements of Northern Manitoba mapping. Many names used were previously established local names, but where no name existed, a name from the World War 2 casualty list was used.

Special colored commemorative name certificates were provided to next-of-kin on request, with the majority issued being World War II casualty names.

MAP OFFICE

The Branch's new location created greater exposure to provincial mapping programs which reciprocated in an increase in the sale of maps and ozalid prints as well as the use of aerial photographs.

Coverage of federally produced National Topographical Series maps 1:50,000 increased by 49 sheets during the year.

FIELD SURVEYS

A retracement survey using photogrammetry was carried out as a project to test the feasibility of using photogrammetry to help in the re-establishment of the original township fabric in the Southern agricultural area of the province.

Under the Manitoba Northlands Agreement (D.R.E.E.) program, extensive horizontal (840 km of second order traversing) and 290 km of vertical control surveys were completed in the Ilford- Gillam- York Factory- Shamattawa areas for the community base mapping.

G. Hawryluk using the EDM (Electronic Distance Measuring equipment HP 3800 in Township 19 Range 2 W.P.M.

(L-R) I. Bowman and B. Davis conducting a retracement survey of the Moose Lake airport and access road. The tanker doubled as a survey vehicle!

On route to a subdivision at Berens River in February - signs at the south end of the of the winter road warn travellers.

Several legal surveys were conducted for water control, recreational development of Crown Land, air strips and subdivisions in Northern communities. Surveys for the Department of Northern Affairs were made in the community of Crane River, Duck Bay, Cormorant, South Indian Lake, Pelican Rapids and Easterville.

CARTOGRAPHY

Routine mapping programs included forest inventory sheets, Geological Survey base maps, new and revised overlays for the Manitoba 1:1,000,000 base, photomosaic plans for Crown Land leases, Game Hunting Regulations, informational maps and a set of full colour maps and graphs for the publication 'Forests of Manitoba'.

A major new project was the Community Base Map series showing building locations, lot lines, contours and topographic information overprinted on a 1:2,000 aerial photo mosaic base. This series provides detailed map coverage for many of the Northern or isolated communities and are revised as required.

Mapping was completed for 31 communities, among them were: Berens River, Brochet, Gods Lake Narrows, Ilford, Manigotagan, Norway House, Shamattawa, Cranberry Portage, South Indian Lake and Wabowden.

PHOTOGRAMMETRY

In the base mapping program, contour compilation was completed for 27 more communities. Contracts were let for 10 of the communities involved, with the Branch monitoring the contracts. Photo mosaics were constructed for 23 Northern communities, while 69 mosaics were constructed for Municipal Planning Branch of Southern Communities.

Forest inventory base mapping was completed in the Molson Lake-Island Lake area. A switch was made from a graphical to a mathematical adjustment with township outlines and points being plotted through a computer on a flat bed plotter. Approximately 4,750 square miles covering 132 base maps were prepared using the new method.

Supplementary aerial photography requests increased due to extensive flooding during the spring.

REMOTE SENSING

A technical information service was set up to provide reference material on the techniques and methods available. In addition to the 600 articles and papers in the Centre, it gained access to a library of documents in the Canada Centre for Remote Sensing in Ottawa.

Methods for monitoring data from the Earth Resources Technology Satellite-1 (ERTS-1) became more sophisticated with the loan of two instruments by the Canada Centre. One being, a Spatial Data Systems density slicer which displays the gray scale of photographic film as colour contours on a colour television screen and the other a Spectral Data Colour Additive Viewer which allows objects of interest to be separated from their background by different combinations of filters.

R. Dixon tries out the new density slicer for analysis of Landsat Data

An electronic planimeter was acquired to provide a fast accurate means of determining areas and linear measurements from any scale of map or photography.

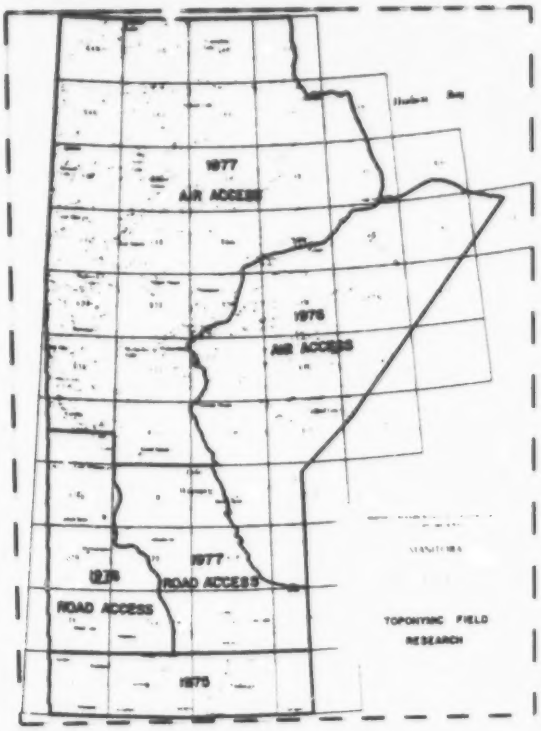
In education and training, demonstrations were given on the operation of the instruments at the Centre. Another program was a week-long Remote Sensing Training Course held at the University of Manitoba attended by 47 people.

H. Pokrant works at digitizing table

1975/76

ADMINISTRATION

In the toponymy program, the first phase of a three year federal/provincial shareable field study was carried out between August and November. The second edition of the *Annual Directory- Manitoba Geographical Names* was published recording 950 new decisions.



FIELD SURVEYS

O. Recunyk stuck while on survey in 29-20-15W

Legal surveys included 52 projects for Water Control Works, 17 projects for Department of Northern Affairs for subdivisions and airstrips including subdivisions at National Mills, Wabowden, and Red Sucker Lake, and 16 projects for recreational development of Crown Land.

D. Lavallee places a target for photogrammetric mapping purposes.

Control survey projects included the establishment of Second Order control networks in five Northern communities integrating the cadastral system into the provincial control network. A total of 350 km of first order levelling was run in the Oxford House/Island Lake area. A different form of vertical control employed was altimetry - a technique which uses atmospheric pressure to determine elevations. It was found useful for requests for establishing elevations around rapids and lakes in Northern Manitoba.

A Doppler Satellite Signal Receiving Station

A new Gyro-theodolite was used for the establishment of Second Order azimuth lines and the Doppler Satellite technique was employed for the establishment of 29 Second Order Control stations in Eastern Manitoba. A receiver uses the doppler principle when receiving frequencies from satellites orbiting above the earth to compute positions of the receiver on the earth.

Accomodation - Pikwitonei subdivision and airstrip survey - C. Tingley, G.Pay

CARTOGRAPHY

Cartographic work included revisions to the Manitoba 1:1,000,000 base map, Crown Land maps, the Winnipeg Provincial Electoral Base map and mining claim maps. Photo base plans for Crown Land leases and base maps for Geological Surveys and Wildlife Regulations were also produced. Among the new projects were the Winnipeg Base Map and the Manitoba 1:500,000 scaled (8 mile) base mapping series.

A total of 413 forest inventory base maps covering 15,000 square miles in the Lynn Lake and Island Lake areas were completed.

Twenty-one Northern communities were mapped at a scale of 1:2,000 with all compilation work either performed or monitored by the Branch.

MAP OFFICE AND AIR PHOTO LIBRARY

The sales of topographical and base maps and use of the Air Photo Library reached an all time high.

The Canada Land Inventory Maps covering the settled areas in categories of Agriculture, Forestry, Wildlife and Recreation were added to the inventory.

The Air Photo Library was reorganized and the inventory was updated to meet the demand for these valuable planning and research tools.

Heather Gunn

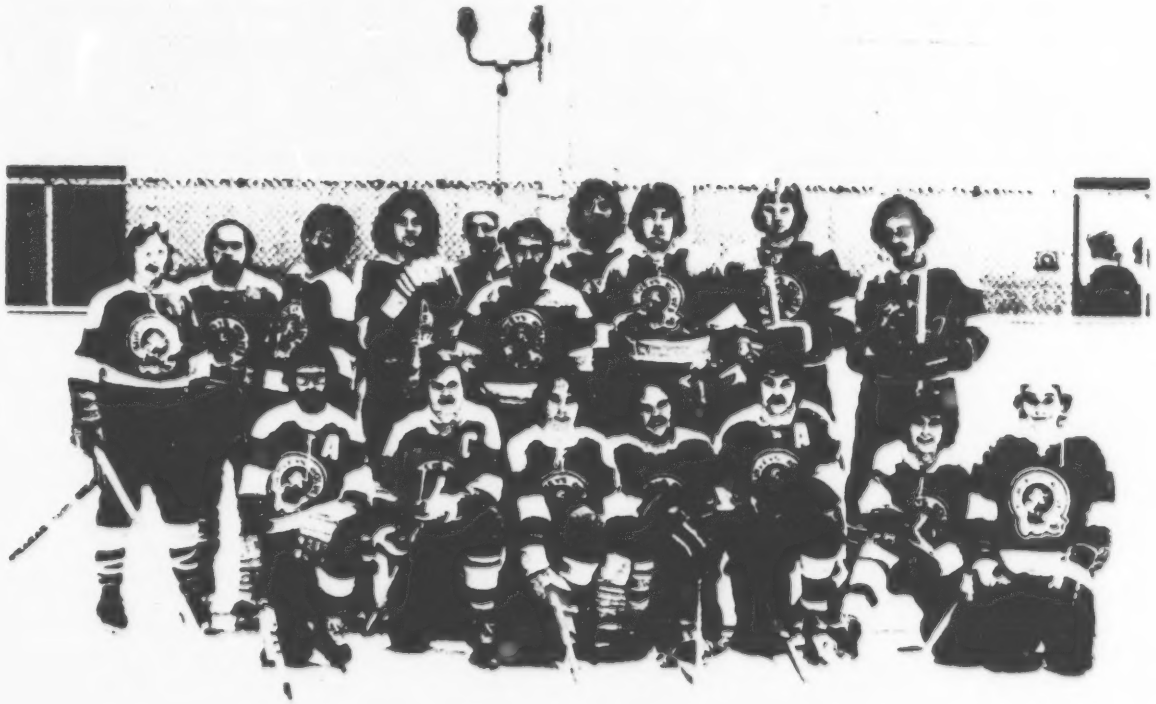
Nancy McIsaac

'Surveys Wolves' Hockey Team

During the mid '70's, Surveys Branch was involved for several years in an intra-governmental hockey league comprised of teams from the Highways Department, Municipal Affairs (Land Acquisition), Manitoba Government Computer Centre (MDS), Health, and Natural Resources (primarily, Surveys).

In 1975/76 the Surveys Wolves were the runners-up for the championship trophy; 4 – 3 losers to the Manitoba Government Computer Centre in the final game. 'Surveys' offensive star of the game (selected by Coach L. Brooks) was centre, Kim Barbour .. defensive star (even though he was quite offensive in the eyes of several members of the opposition) was team Captain Murray Foster. As usual, goalie Claude Roux was blamed for the loss.

In addition, the Surveys Branch, supported by Forest Inventory, iced an 'exhibition' version (see 'Roster') that played such outstanding opposition as the Association of Manitoba Land Surveyors and the 'City Fathers' (Winnipeg Councillors). Murray Foster again proved his worth by inflicting a (small) gash to (Hon.) Gerry Mercier's nose in one encounter. While the exhibition team had somewhat less talent overall than the 'league' team, it probably had a lot more fun.



'Surveys Wolves' (League) Hockey Team (Circa 1975/76)

Back Row (L – R) – Larry Dewis (Mines); Deke Lavallee; Butch Hawryluk; Kim Barbour (Mines); Rae Tanner; Claude Roux; Dale Richardson; Wayne Leeman; Gerry Lux (Forestry); Dewey Hoplock

Front Row (L – R) – Dave Steeves; Murray Foster; Wade Zammit (Forestry); Murray Smith (Forestry); Mike Szmigelski (Forestry); Ken Mudry (Forestry); Steve Bossenmaier

Missing – Lorne Brooks (broken ankle)

ROSTER

"Surveys Wolves"

Surveys Branch 'Exhibition' Hockey Team 1975/76

General Manager	Dave Pihulak
Secretary-Treasurer	Rae Tanner
Playing Coach	Lorne Brooks
Trainer	Ian Bowman
Statistician	Bill Krasnikoff

1 – Roux, Claude
2 – Richardson, Dale
3 – Leeman, Wayne
4 – Tanner, Rae
5 – Atkinson, Austin
6 – Foster, Murray
7 – Harris, Bob
8 – Szmigelski, Mike
9 – Hawryluk, Gerry
10 – Douglas, Bob
11 – Fraser, Gary
12 – Lavallee, Derek
13 – Brooks, Lorne
14 – Steeves, Dave
15 – Kaminsky, Warren
16 – Hoplock, Dewey
17 – Spence, Ron
19 – Borden, Dan
20 – Stevens, Dave
21 – Smith, Murray
22 – Cass, Al
23 – Pihulak, Dave
24 – Lux, Gerry

1976/77

ADMINISTRATION

The second phase of the Federal/Provincial toponymic field research program was conducted by road in the Southwest and by air in the North. Thousands of names, never previously recorded, were brought to light and valuable contacts were established for future toponymic questions.

'What can I say?' D. McKinnon, Branch Administrative Officer for the D.R.E.E. Program

D.R.E.E. Mapping Program

The Province entered into a five year cost-shared mapping agreement in 1976 with the Federal Government through its Department of Regional Economic Expansion (DREE). It became apparent to the branch at this time that a standard Mapping System for Manitoba would have to be developed to properly coordinate all future mapping needs within the province. One of these standards was that all future map sheet borders, regardless of scale, would be based on geographical coordinates. Also, the information on maps would be divided into different overlays or themes. Any combination of these overlays could be utilized to produce a specific product.

Based on information obtained from a survey of map users, the branch decided on a scale of 1:20,000 for the DREE project. This involved production of both a photo base and line base final product for approximately 80 map sheets in areas where there was a need for mapping.

FIELD SURVEYS

Legal Surveys

(L-R) D. Lavallee, B. Strike, P. Eliuk and G. Richardson on Special Survey of Twp. 3 Rge. 1 E.P.M.

The 16 requests for Crown land surveys included Indian reserves, wildlife management areas, re-establishment of monuments, land exchanges, parcel plans and a reservoir. Fourteen surveys for Parks Branch were conducted; (210 cottage lots were surveyed), while 17 plans (252 lots) of northern community subdivisions and 79 plans were registered for water control works.

Control Surveys

Mapping control was established in the communities of Wawanesa, Melita, Souris and St. Andrews.

Accomodation for a couple of days during survey of the Indian Reserve Boundary and airstrip at Red Sucker Lake. The survey crew included G. Hawryluk, G. Fraser, R. Bartlett and D.Kent

(L-R) A. Cass and B. Davis in action during subdivision survey at Rocky Lake.

The major program was the DREE activities with the following highlights:

- 50 Doppler Satellite Control Stations and 418 kilometres of First Order levelling were established in central and east central Manitoba respectively;
- 45 stations were targetted for mapping in the Little Grand Rapids-Bissett- Riverton areas with 2,500 miles of altimetry established in total between this area and the Ilford-Gillam area;
- mapping control was established in 17 northern communities for the 1:20,000 Community Base Mapping Program.

Helicopter Goes Down

In October, 1976, a helicopter carrying the pilot and three Branch personnel - F. W. Leeman, W. Kaminski, and M. K. Finnie capsized into the cold and rough waters of Stevenson Lake. It was landing on the lake as part of a project to determine the elevations of a number of lakes between Norway House and Island Lake. Luckily none were hurt and all managed to make it safely to shore. After building a fire and shelter, time was spent drying out, building several signal fires and investigating the island surroundings. The party was rescued some 24 hours later by an Island Lake search plane which flew the tired and hungry, but relieved, group to Garden Hill from where they later returned to Winnipeg.

COMPUTATIONS AND DATA

This new section was established to provide technical support in the areas of computer software, research and development for geodesy and control surveys, photogrammetry and cartography.

Mapping co-ordinates, map sheet corners and township corners were computed for a area of 56,300 square kilometers, including acreage for 425 townships for the Forest Inventory program. As well they examined 73 plans of survey and responded to 300 requests for information.

Computer software was developed for the Survey Data Base utility routines.

CARTOGRAPHY

Eighty-nine legal survey plans, 10 wild rice lease plans and the revision of 6 forestry tower maps were completed.

Under the Community Base Mapping Program (1:2,000) 40 new map sheets, covering 17 communities were produced; specifications were prepared for 1:20,000 scaled mapping; and several maps were updated, including the 1:30,000 City of Winnipeg map, the Survey Control Map and the Flight Information Supplement.

The Branch purchased an Agfa Gavaert Mark IV camera which was able to copy aerial photograph prints with a reproduction quality of 85original print. This meant the customers wanting prints were then able to order copies of enlargement from the branch.

MAP OFFICE AND AIR PHOTO LIBRARY

In the Map Office, a significant addition to the stock was the Aeronautical Charts for all of Canada. The Air Photo Library was reorganized and reclassified to a new lending status with the implementation of the new photo copy system providing prints of stock photos within two days.

PHOTOGRAMMETRY AND REMOTE SENSING

A Wild A-10 plotter and EK-22 digitizer system was purchased to be used in conjunction with the new 1:20,000 mapping program.

Besides input towards the 1:2,000 community maps for the Departments of Northern Affairs and Municipal Affairs, the photogrammetry unit worked on the DREE mapping program.

The 70mm supplementary aerial photography service responded to 33 requests for resource identification and for monitoring programs such as hay production on Crown lands and spring flood conditions.

The Remote Sensing Centre's facilities were used for projects such as the Brandon Land Use Study, Range Land Remote Sensing and a road location from Berens River to Pigeon River. In-house seminars were provided to departmental staff and university and college students. Staff responded to approximately 1,000 data related enquiries.

1977/78

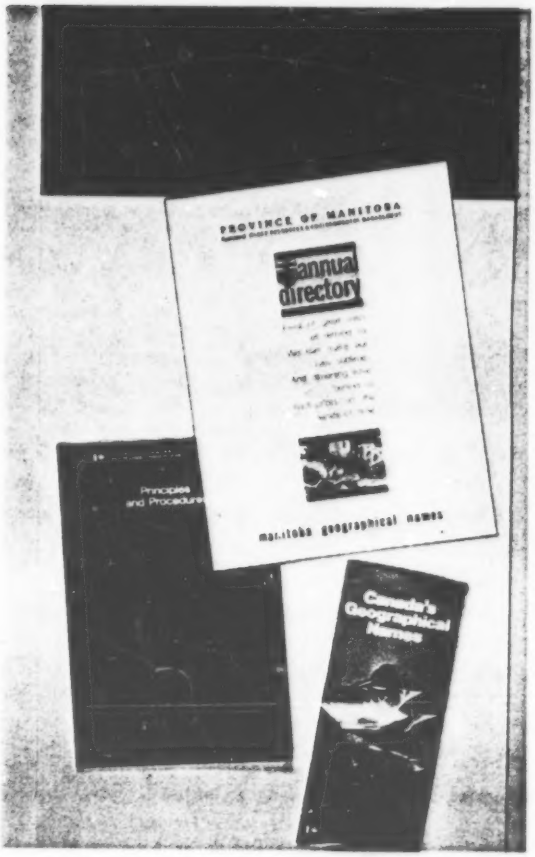
ADMINISTRATION

The field research on Manitoba's Geographical Names continued in its the final phase. Research teams worked in the Interlake and Northwestern regions of the Province.

(L-R) J. Mercredi and G. Holm process geographical name data in the Toponymy Unit.

More than 2,000 name decisions were made, based on the field data collected in 1976/77.

The 1977/78 *Annual Directory- Manitoba Geographical Names* was printed and distributed listing 1,200 new names.

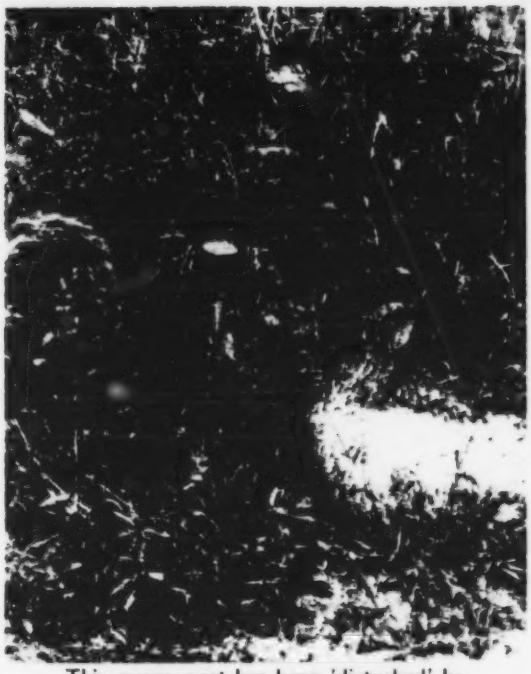


FIELD SURVEYS

Legal Surveys

Field work was completed on 19 Crown Lands survey requests, 10 Parks Branch cottage lot subdivisions (325 lots), and 31 Water Control surveys.

The Northern Affairs survey requests resulted in the registration of 16 plans. Of these, 9 were plans of subdivisions (among them a 59 lot subdivision at Duck Bay), 2 were plans of public roads and 5 were parcel plans (including 3 airstrips and 1 proposed Indian Reserve).



This survey post has been 'disturbed' by water erosion (20-30-19 W.P.M.).

Control Surveys

Extensive survey control was conducted in Northern communities under the 1:2,000 scale community base mapping program. As well, control for the 1:2,000 scale flood risk mapping program was completed in Elie, Melita, Souris, Wawanesa and Carman.

Surveys were in support of the DREE 1:20,000 scale mapping program, including an altimetry project yielding 3,000 km of elevations in the Thompson-Gods Narrows area, a Doppler satellite project resulting in the establishment of 43 Doppler stations in Northwestern Manitoba, and a levelling project producing 275 km of 1st Order Vertical Control in the Berens River area.

COMPUTATIONS AND DATA

Mapping coordinates, map sheet corners and township corners were computed for 1:20,000 scaled mapping in the Little Grand Rapids, Bissett, Riverton, Lundar, the Turtle Mountain Provincial Park and in the Grand Beach and Lac du Bonnet areas. Also, 1:2,000 Community Base Mapping coordinates were computed for the Northern Communities of Gods Lake Narrows, The Bluff and Seymourville.

Seventy-four plans of survey affecting Crown Lands were examined for approval under The Surveys Act.

CARTOGRAPHY

Eighty-one legal plans, one wild rice lease, six survey field note forms, two mineral claim sheets and one designated vehicle route map for distribution to hunters were prepared.

Revisions were made to: 5 registered trap lines, 1 forestry tower map, 7 maps used in the game hunting brochure and 35 maps used in the Wildlife Lands Book.

Special projects completed: original cover art work for two publication catalogues, the flight information map and the Annual Directory. Also, a series of 21 region and boundary overlays, 14 Indian lands maps, the original color mapping for wildlife management area brochure and three provincial enforcement zone maps under the Community Base Mapping Program, eight new 1:2,000 scaled map sheets, covering two communities were prepared, three sheets were revised, several sheets were reduced to a scale of 1:4,000 and 14 sheets were completed for the southern community of Winkler.

The Southern Manitoba section (Sheet One) of the new Base Map of Manitoba at a 1:500,000 scale and its four special overprints were well received among the public and private sectors.

Special projects included the Angling Map, Winnipeg Electoral Boundary maps,and the aerial photo and map catalogues. The pilot sheet and specifications for the new 1:20,000 scale map series, being prepared under DREE, was completed.

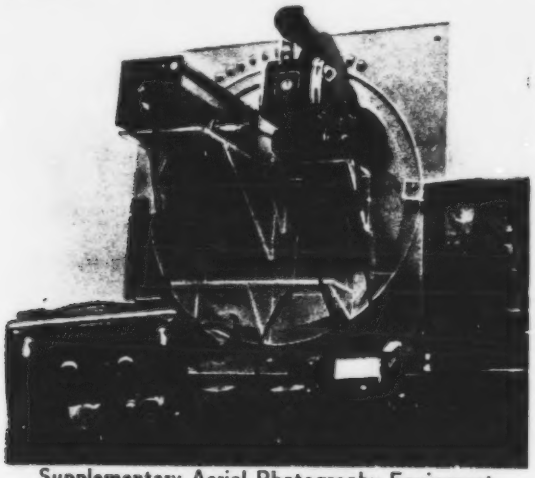
The photomechanical unit reported the following work achieved: 285 rectified prints, 10,122 aerial photo prints, 10,491 air photo enlargements, 2,420 contact prints on vacuum frame, 10,146 contact prints on Log E processor, 346 camera exposures, and 110 70mm films processed.

PHOTOGRAMMETRY AND REMOTE SENSING

Photogrammetry provided the topographical data in the production of 1:2,000 Northern Community Maps for the Department of Northern Affairs, 1:2,000 Southern Community maps for Municipal Planning Branch and the DREE 1:20,000 mapping program. Assistance was provided in establishing a data base for a flood plain mapping project.

There were seven request submitted for airborne remote sensing projects with an estimated 585 line miles. Success was realized on three projects with 350 line miles completed. One request was cancelled due to costs and the other three due to time restrictions and in part to weather which was poor during the flying season.

A Bausch and Lomb ZT4-H Zoom Transfer Scope, capable of enlarging data up to seven times and enabling 1:1,000,000 original information to be directly transferred to a broad range of existing map bases, was acquired.



Supplementary Aerial Photography Equipment

The 70 mm Supplementary Aerial Photography project received requests from 29 agencies, amounting to over 7,000 line miles but, because of weather problems, during late July and most of August, only 4,830 miles were completed.

R. Douglas took this photo of pilot L. Syring and co-worker H. Pokrant before flying out to complete a supplementary aerial photography project near Dauphin.

MAP OFFICE AND AIR PHOTO LIBRARY

A long range program of advertising and promoting the use and availability of the products and services of the Map Office/Air Photo Library was initiated. The success of this program has been manifested in the 25% increase in sales and enquiries from Manitobans and prospective tourists alike.

An inventory of the Air Photo Library was completed, initiating plans for a major upgrading to begin in 1978/79.

1978/79

To provide the reader with an insight into the activities and outputs of the various sections, the format of this year's data has been revised to reflect specific details.

ADMINISTRATION

Programs were directed and administered to meet the requests for service from other government departments. Administrative support in secretarial, budget and personnel services were provided to other branch sections.

Legal Land Descriptions

- 20 Minister's Orders under Section 209(8) of the Municipal Act.
- 10 Consents of the Minister of the Municipal Board of Manitoba regarding cancellations of plans of subdivisions.
- 25 Investigations and recommendations concerning requests for Crown land reservations, original reservations in grants and mines and minerals required by tax sale.
- 100 acreage calculations and verifications for Agricultural Crown Lands grazing leases, etc.
- Land descriptions and acreages were prepared for the Mining Recorder's office: 5 production leases; 10 exploration area leases; 25 lands designated for casual permits; 200 quarry mineral leases; 20 quarry exploration permits.
- 225 land descriptions and acreages for Crown Lands Branch concerning Orders-in-Council, conveyances, leases, agreements and exchanges.

Toponymy

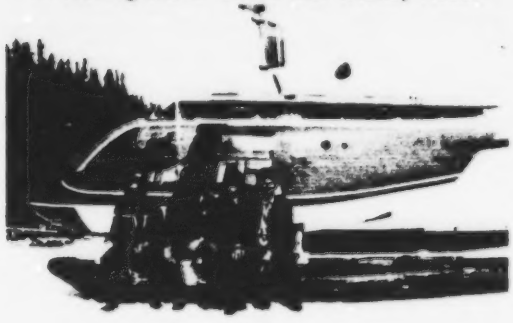
- Processed the remaining Federal/Provincial toponymic field data resulting in approximately 2,000 name decisions.
- Compiled and released 1978/79 Annual Directory-Manitoba Geographical Names.
- Issued 40 Commemorative Name Certificates.

- Toponymic quality control checks continued on new maps, plans and reports.
- Satisfied 250 requests for name information.

FIELD SURVEYS

The prism returns the signal to the EDM instrument during a survey along the Nelson River (East Channel).

J. Watling and L. Cowan near Norway House



T. Tataryn, D. Richardson, A. Cass and N. Rostkowski

Legal Surveys

In addition to 2 Boundary Surveys and 2 Special Surveys, this section responded to requests for 63 surveys from these other branches or agencies:

- Parks Branch - 14
- Crown Lands Branch - 12
- Water Resources Division - 24
- Department of Northern Affairs - 13

Eighty-two plans of survey affecting Crown land were examined for the approval of Director of Surveys.

Control Surveys

Control surveys were carried out in 9 communities for the DREE (1:2,000) base mapping project. Second Order control was established for 5 communities for the Department of Municipal Affairs and mapping control was established in 3 Forest Management Units.

COMPUTATIONS AND DATA

- Examined 74 plans of survey and provided scaled coordinates for plotting control of 28 cadastral survey plans.
- Provided mapping control coordinates for the forest inventory mapping program in management units 12, 34, and 38 with preliminary coordinates established for unit 22.
- Provided horizontal mapping coordinates for DREE 1:20,000 mapping program in Quads 16 and 34 and provided cadastral control coordinates for three communities for the community base mapping program.

- Re-adjusted 10 control traverses as an updating measure.
- Prepared survey data base software routines, documentation and user manuals.
- Made software modifications to the Annual Directory program and control survey adjustment package.
- Answered 315 requests from government and public agencies.

GEOGRAPHIC MAPPING

Drafting/Cartography Unit

- Community base mapping (1:2,000) - 43
- DREE mapping (1:20,000) - 2
- Plans of Survey - 58
- Wild rice leases - 9
- Lake depth maps - 38
- Crown land overprint on 1:250,000 NTS map sheets - 6
- Revisions or updates:
  - Fisheries inventory program maps - 16
  - Game hunting area maps - 12
  - Big game questionnaire and units - 3

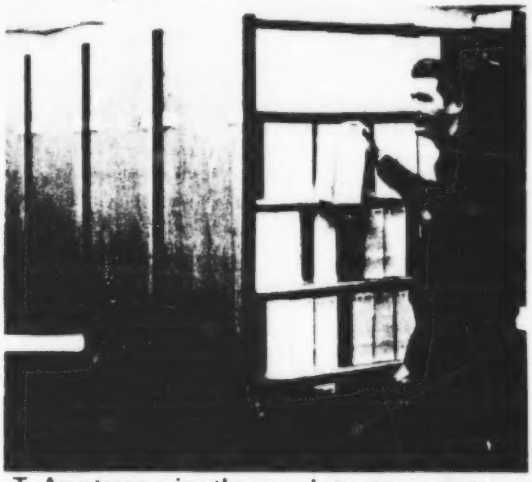
In addition to these projects, several other maps were prepared for publication including a Manitoba Angling Map showing stocked waters, landsat interpretation map, goose flyway map and provincial electoral boundaries map.

Photo-mechanical Unit

- Vacuum frame exposures - 3,735
- Enlargements - 16,979
- Contact prints - 5,787
- Camera exposures - 12,498
- Rectifier Exposures - 559
- Stripping film exposures - 242
- Dry print exposures (Microfiche) - 1,113
- Film processing (Rolls) - 179
- Color key (Sheets) - 123

MAP OFFICE AND AIR PHOTO LIBRARY

To make the general public more aware of the various maps available, a display was set up at the Winnipeg International Boat Show. The Map Sales Office was redesigned to display maps with indices provided thereby allowing customers to browse and select. This system has reduced the time spent by staff in assisting customers' map selection.



T. Armstrong using the new photo storage system.

S. Sadonick and T. Armstrong using a microfilm reader to locate desired photo from a 'flight line' map.

Services were provided to 12,500 counter customers and 3,500 mail order requests which accounted for distribution of 20,000 air photos and photo prints and maps. About 15,000 air photos were reviewed by counter customers.

The staff also provided 90,000 square feet of prints from the ozalid printer.

PHOTOGRAMMETRY AND REMOTE SENSING

Photogrammetry

- 8 photo map sheets for 5 communities (1:2,000)
- Aerotriangulation of 10 map sheets of Southern communities (1:2,000)
- Aerotriangulation of 107 map sheets of Northern communities (1:20,000)
- 60 photo mosaics

Remote Sensing

Technical information was provided on research in remote sensing related to landbased disciplines. The staff conducted several remote sensing courses. One special project was carried out to determine the damage to vegetation in the Shilo military area.

1,200 customers visited or contacted the Centre for information, project assistance and use of equipment.

4,070 line miles of supplementary aerial photography was requested. The principal users were municipal planners, surveyors for identifying field (mapping) control stations, foresters for mapping burn and cutover areas, land inspectors for assessment work and geologists for sand and gravel mapping.

BRANCH RE-ORGANIZATION

On January 1st, 1979, all available Branch resources required to develop an integrated surveying and mapping system and to deliver mapping programs were combined to form the Control Surveys and Mapping Section. Other organizational changes included the combining of the Map Office and Air Photo Library with the Remote Sensing Section.

1979/80

The Departmental re-organization caused several changes to be made between 1978 and 1980 as identified by the organizational charts. For example, on October 13th, 1978 the Branch was in the Planning and Management Division, Department of Northern Affairs, Renewable Resources and Transportation Services; by January 16th, 1979 it was in the Lands and Surveys Division of the Department of Mines, Natural Resources and Environment; and by March 4th, 1980 it was in the Operations Division of the Department of Natural Resources.

ADMINISTRATION

In addition to conducting toponymic quality control checks on 225 mapping manuscripts more than 1,380 geographical name decisions were processed and 350 requests for information satisfied.

LEGAL SURVEYS

There were 79 surveys completed for other branches or agencies:

- Parks Branch - 10
- Crown Lands Branch - 19
- Water Resources Division - 23
- Water Services Board - 7
- Dept. of Northern Affairs - 20

In survey categories these were:

- Subdivisions - 24
- Retracement - 12
- Water Control Works - 18
- Rights-of-Way - 6
- Public Works - 9
- Miscellaneous - 10

Water Control Survey near Oak Bluff

The section also conducted special surveys and examined 53 plans of survey. Requests for surveys above the normal workload were contracted to private surveyors.

Some staff take time out for a photo

(L-R) B.Davis, C. Roux, G. Wood, P. Eliuk

J. Taylor , R. Cederwall

CONTROL SURVEYS AND TOPOGRAPHICAL MAPPING

The section units, Control Surveys, Computations and Data and Topographical Mapping were involved in producing mapping required under the Northern Flood Agreement, the Flood Damage Reduction Program, the DREE (1:20,000) Mapping Program and other miscellaneous projects. Approximately 240 map sheets were produced and made available to government and industry through the Map Office.

The Control Surveys Unit participated in a joint Federal/Provincial program that constructed 200 control stations in southern Manitoba. Plans were made to measure their positions during the summer of 1980 utilizing new technology (Inertial Survey System) and may yield positional values comparable to conventional methods at 35% of the cost.

The Computations and Data Unit, in addition to providing the required support for the above mapping programs, continued with their program of mathematically assessing the quality of existing surveys, establishing a positional data file and disseminating this information to government and industry.

GEOGRAPHIC MAPPING

Drafting/Cartography Unit

- Plans of Survey - 67
- Court Exhibit Maps (Wildlife Enforcement) - 3
- Fisheries Inventory Program (Base Maps & Contour Maps) - 42
- Hunting Regulation Maps - 12
- Vehicle Route Maps - 5
- Commemorative Name Certificates - 39
- Manitoba (1:500,000) Sheets 1 & 2 Plate Negatives - 2
- Manitoba Base Map (1:2,000,000) Printing Negative - 1
- Provincial Constituency Maps Plate Negative - 7
- Official Boundaries Booklet - 35
- Map Index - Plate Negatives - 32

Photomechanical Unit

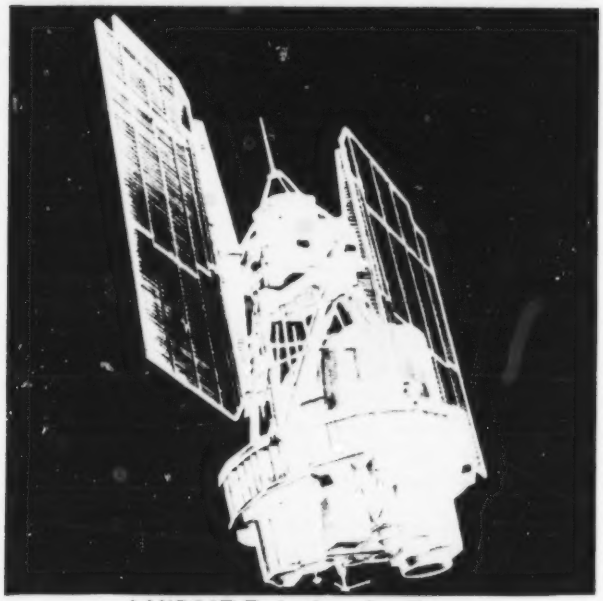
- Vacuum Frame Exposures - 4,560
- Enlargements - 20,105
- Contact Prints - 17,379
- Camera Exposures - 9,742
- Rectifier Exposures - 302
- Stripping Film Exposures - 287
- Dry Print Exposures (Microfiche) - 4,377
- Film Processing (Rolls) - 125
- Color Key (Sheets) - 293

Several other maps were prepared for publication: Big Game Questionnaire Maps, Manitoba Relief Map, Manitoba Landsat Mosaic Map, Indian Land Claims Map, and Fire Patrol Flight Line Map.

MAP DISTRIBUTION AND REMOTE SENSING

The Map Sales and Air Photo Library Units were separated and renovated to provide improved service. Facilities were established in the departmental regional offices in Brandon, Dauphin, The Pas and Thompson.

The Air Photo Library completed a three year program to update their inventory to include all available photos applicable to Manitoba. It was estimated that this brings the total to over 1,000,000 photographs ranging from 1923 to 1980.

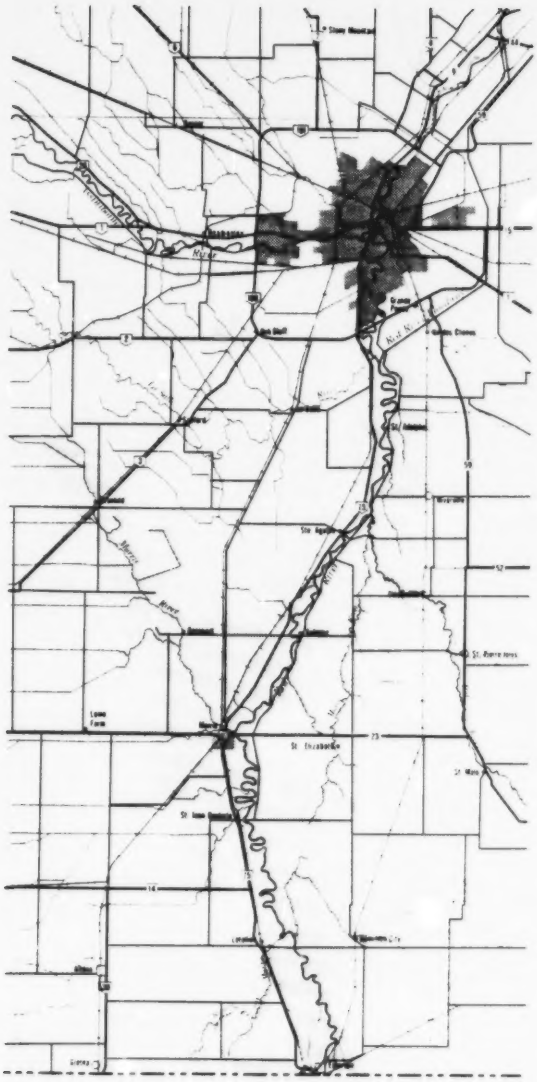


LANDSAT Technology Satellite
Altitude = 800 kilometres

The Remote Sensing Centre provided technical information to users of Landsat imagery data for several projects from mapping wildfire in northern regions to studying caribou habitat. The centre became responsible for the maintenance and operation of an AGA thermal unit which was used extensively in determining forest fire 'hot spots' and perimeters. The centre also continued to provide courses, seminars and tours.

The principal users of the 6,840 line miles of Supplementary Aerial Photography were the Departments of Municipal Affairs, Agriculture, Highways and Natural Resources. Of particular note was the acquisition of color infrared photography of Netley Marsh for the Wildlife Branch.

During the height of the 1979 spring floods, the Centre coordinated the acquisition of Side Looking Airborne Radar (S.L.A.R.) and Synthetic Aperture Radar (S.A.R.) for the Provincial Water Resources.



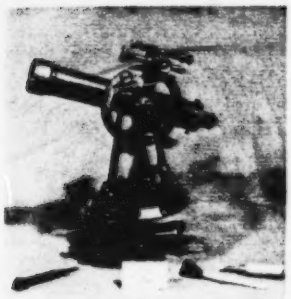
Area Flooded 1979

MAPPING UPDATE

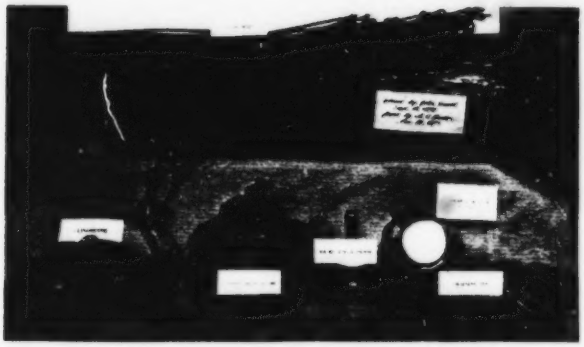
The Branch had come a long way in the mapping industry in its first fifty years - from the printing of the first 'hand lettered' map in 1931 to full-colour base maps in the 1970's using the scribing technique. The program had expanded to meet commitments under the 5 year DREE cost-shared mapping agreement, signed in 1976, and the 1977 Northern Flood Agreement.

Tremendous technological changes were yet to come in the 1980's.

SURVEY INSTRUMENTATION

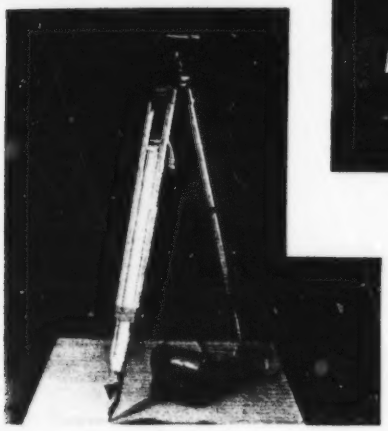


Transit Theodolite TS 1055
Made in Canada



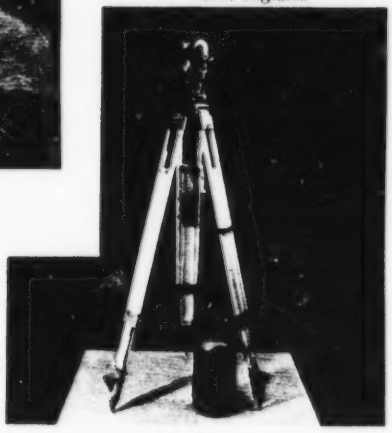
Display Cabinet

Surveyors Transit
Cooke, Troughton & Simms
York, England



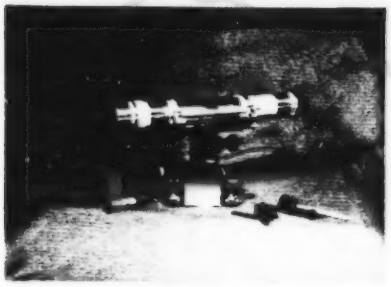
N-2 Level

Electronic Distance
Measuring Equipment
Hewlett Packard HP 3800



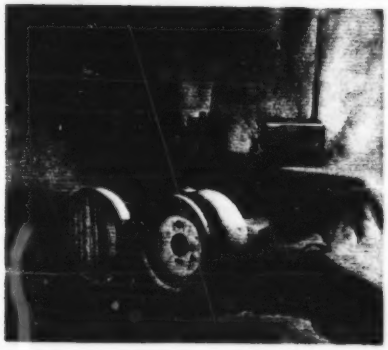
TIA Transit

N-2 Level, Tripple Prism
Surveyors ADD Chain, Plumb Bob

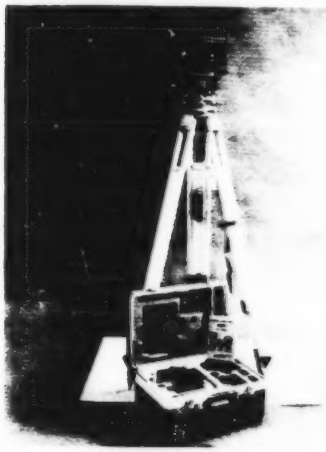


Carl Zeiss
1st Order Level

T-2 Theodolite with
Stride Level on Top

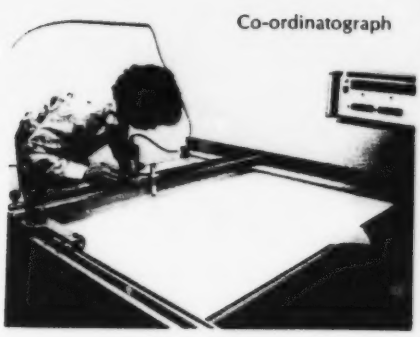


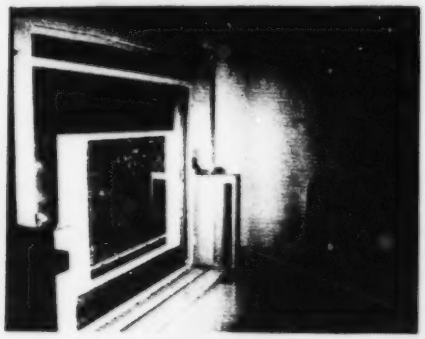
Communication Equipment
Motorola 2-Way Radios, Time Cube Radio
Altimeter, Silva Hand Compas



Infra-Red Electronic Distance
Measuring Instrument
(SOKKISHA RED 2)

A SAMPLING OF CURRENT OFFICE EQUIPMENT c 1980


Co-ordinatograph



Jena Interpretoskop

Supplementary Aerial Photography Equipment

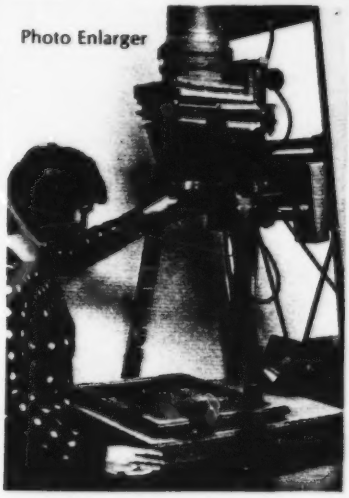
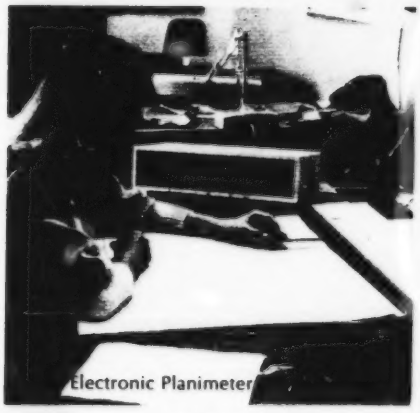
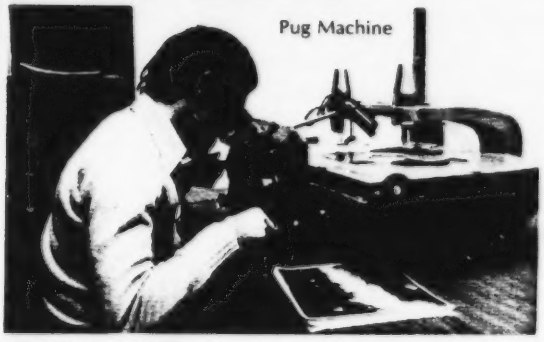


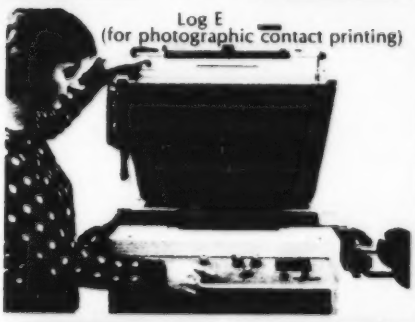
Photo Enlarger

Wild A8 Stereo Plotter


Electronic Planimeter

Typeset Machine


Pug Machine


Log E
(for photographic contact printing)

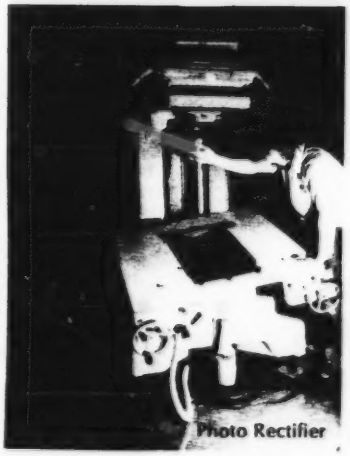
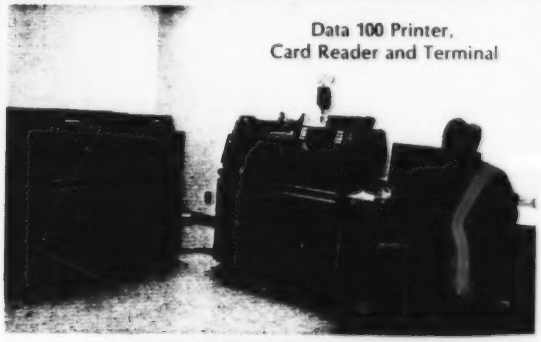
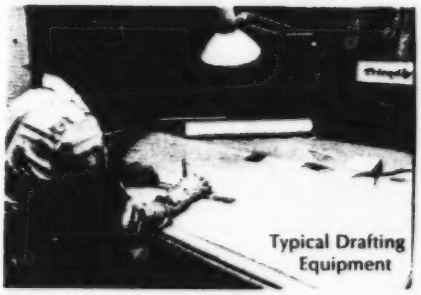
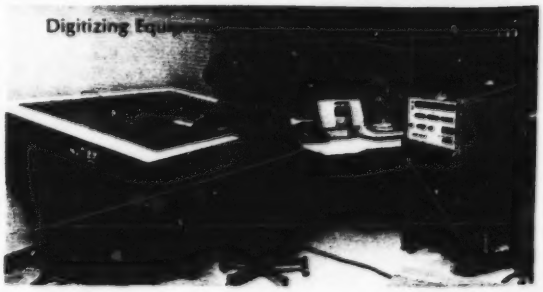


Photo Rectifier


Data 100 Printer,
Card Reader and Terminal


Typical Drafting Equipment


Digitizing Equ...

THE EIGHTIES - INTO THE FUTURE

The Eighties were the years of updating existing technology to the new standards of the decade and of responding to increasing demands for more maps and services.

The highlights include the promotion of a multipurpose land information network for Manitoba; the purchase of Global Positioning System (GPS) receivers - satellite positioning technology; the preparation and production of the Manitoba Atlas; installation of the branch computer; and conversion to a computerized mapping operation.

A summary of activities is appended in table format to provide details of production in areas related to Land Description Services, Field Surveys, Plan Drafting, and the Manitoba Geographical Names Program.

1980/81

ADMINISTRATION

Historically, the Branch's administrative services were the responsibility of the Director's office and were handled through the department's administration staff. As the Branch grew to over 80 staff each section became more responsible for their financial and personnel matters establishing individual administrative units.

In 1981, the Administrative Services were consolidated in the Administration Section to provide financial, personnel and operational support services for all Branch programs.

Legal land descriptions and areas were prepared for the Agricultural Crown Lands Sale Program, and for the Local Government District Land Return and Exchange Program. A major project was the work required for the Hudson Bay Railway and Riding Mountain National Park under the Mines and Minerals Exchange Program.

J. Mercredi interviews P. Reader during field trip to The Pas, August, 1980.

Within the Toponymy Unit, 217 geographical name decisions were made, 15 original and 28 duplicate Commemorative Name Certificates were issued, and 2 field trips were conducted in The Pas and St-Pierre-Jolys areas.

LEGAL SURVEYS

Seventy-one Plans-of-Survey affecting Crown lands were examined for the approval of the Director of Surveys. Field work was completed for a total of 99 surveys as requested by various departments and agencies within the provincial government. All surveys above the normal capability of the Branch' field crews were contracted to private surveyors.

A modest beginning was made on the preparation of Director of Surveys cottage lot plans for registration in the Land Titles Office to facilitate the future sale of existing lots.

CONTROL SURVEYS AND TOPOGRAPHIC MAPPING

The Control Surveys Unit completed field control networks for the contour mapping of Morden, Neepawa, Starbuck and Dauphin plus inspection of control work for Swan River, Ochre River, Ste. Rose du Lac and Grande Pointe which were contracted to private industry.

The Computations and Data Unit provided mapping and cadastral co-ordinates for the Department of Regional Economic Expansion (DREE) 1:20,000 mapping program along with similar support for other programs. This unit also continued with its program of mathematically assessing the quality of existing surveys, establishing a positional data file and disseminating this information to government and industry.

The Topographical Mapping Unit was involved in the preparation of the photogrammetric data base and the production of mapping under the DREE mapping program. Additional mapping was produced under the Northern Flood Agreement, the Flood Damage Reduc-

tion Program and other miscellaneous projects. Inspection of privately contracted mapping and aerial photography was also carried out.

T. Tataryn examines a 'disturbed' survey monument used for bracing a fence in Twp 8 - Rge 22W.

GEOGRAPHIC MAPPING

In addition to these projects, several other maps were prepared for publication, including an *Historical Map Commemorating the 100th Annual Meeting of the Association of Manitoba Land Surveyors*, Land Classification Maps, North of 53 Degrees and Key to Winnipeg Tourist Maps, Provincial Electoral Maps, School Division Maps and Farm Water Potential Map.

MAP DISTRIBUTION AND REMOTE SENSING

The Map Sales and Air Photo Library experienced a boom in sales due to their participation in additional promotional exhibits, including the Sportsman's Show, the Winnipeg International Boat Show and a shopping mall display.

The Air Photo Library installed a new rapid search system consisting of a 35 mm microfilm aperture card deck of all aerial photography flight maps dating back to 1923. These flight maps comprise all class "A" or mapping quality photography, 70 mm supplementary photography, contract photography and airborne remote sensing photography.

The Remote Sensing Centre realized a steady growth of interest and demand for service which was accomplished in part by the acquisition of the Purdue University audio visual self-teaching courses. In addition to this new service, the completion of a study to determine remote sensing renewable resource monitoring needs in Manitoba led to the Centre's involvement with several projects. These included an ecological (biophysical) land classification of the Local Government District of Mystery Lake and the Grass River Provincial Park, and a caribou habitat study for the Wildlife Branch.

1981/82

ADMINISTRATION

The Toponymy Unit staff wrote and distributed a series of 15 articles to nearly 50 rural newspapers throughout the province. The articles described the history of place names in Manitoba and outlined the role the Department plays in assigning and researching them.

LEGAL SURVEYS

One hundred and one Plans of Survey affecting Crown lands were examined for the approval of the Director of Surveys, representing a 42% increase over the previous year. Field work was completed for 83 survey projects, many of which were larger than normal. All surveys in excess of the annual production of the Branch's staff were contracted to private surveyors.

An integrated retracement survey program, related to the provincial township system, was implemented in conjunction with the Land Titles Office to create savings and increased efficiency for future users of surveying and mapping resources.

(L-R) R. Cederwall, N. Rostkowski (Kneeling), L. Cowan and I. Robertson, Norway House.

(L-R) G. Hawryluk, J. Watling, J. McLean with original wooden survey post found 490' south of true position (7-35-21W), March 23, 1982.

CONTROL SURVEYS AND TOPOGRAPHICAL MAPPING

Interim specifications were developed for use by government and private surveyors in surveying townships under *The Special Surveys Act*. This initiative resulted in those townships becoming an integral part of a multi-purpose survey system. The Section continued with its program in south-central Manitoba of integrating the geodetic reference framework with the land survey system, as a cooperative project with the federal topographical control survey program.

Base mapping under the Flood Damage Reduction (FDR) Program was carried out in the communities of Lorette, Ste. Anne, Gimli, MacGregor, La Riviere, Rosenfeld and Gretna.

The medium scale 1:20,000 mapping data base covering a portion of northern Manitoba was completed. Urgent mapping requirements at this scale could be met within a three month time frame as compared to a previous delivery time of one to two years.

Administrative and technical support was provided to the Inter-departmental Committee on Aerial Photography and Photogrammetric Mapping. This Committee's responsibilities included the coordination of the acquisition of all provincial aerial photography and photogrammetric mapping, ensuring multi- purpose use and minimizing duplication. Inspection of all contract mapping and aerial photography was conducted to ensure adherence to specifications.

The ongoing program of establishing a computerized positional data file for provincial surveys allowed the staff to respond to over 300 requests for technical information from government and industry.

GEOGRAPHIC MAPPING

Staff provided mapping for resource, boundary and land disposition purposes, including new maps, overprints on existing maps and revisions to regular publications. A total of 279 single and full color projects were completed, including 30 Crown land map overprints, 74 official boundary maps and 143 miscellaneous projects such as custom art work, pamphlets and public information brochures for various agencies and departments.

The drafting unit prepared 152 line and photobase plans of legal surveys and described boundaries, of which 77 were wild rice lease plans. Additional projects included preparation of 12 certified township mosaics for wildlife enforcement and endorsement of revisions and supplementary data on 176 legal plans.

The photomechanical unit provided a full range of photographic services in response to in-house requests and from other government departments and agencies.

MAP DISTRIBUTION AND REMOTE SENSING

The Map Sales and Air Photo Library continued their participation in promotional exhibits and as a result realized an increase in sales, with service to approximately 11,000 customers. Revenue increased from $86,900 in 1981/82 to $125,700. Map sales outlets were set up in regional government offices in Brandon, Dauphin, The Pas and Thompson to better serve regional customers.

A 16 mm microfilm retrieval system for 750,000 aerial photographs was put into operation in the Air Photo Library. The system allows rapid and automatic perusal of the photo imagery and is primarily designed for customers wishing to conduct their own photo search.

The Remote Sensing Centre participated in the 7th Canadian Symposium on Remote Sensing, held in Winnipeg in September. The Centre carried out several projects including preliminary mapping of deer habitat in southwestern Manitoba, leafy spurge distribution in Spruce Woods Provincial Park and Canadian Forces Base Shilo, and two land use studies in south-central Manitoba.

Approximately 7774 line miles of supplementary aerial photography was flown. The main users of the supplementary aerial photography were the Department of Municipal Affairs and our Forestry Branch.

1982/83

ADMINISTRATION

The Toponymy staff provided liaison and consultative services to government and the public regarding the early history and official methods of managing Manitoba's geographical names. Presentations were made to interested groups, and two supplements to the *Gazetteer of Canada-Manitoba, 1981* were printed.

The staff contributed to and participated in the Seminar on The Production, Content and Future of Gazetteers in Canada at a meeting held in Ottawa.

LEGAL SURVEYS

A decrease in legal survey requests from Water Resources, Parks Branch and Northern Affairs was offset by increases from Crown Lands, Northern Flood Agreement surveys and retracement surveys. The number of plans deposited for approval under *The Crown Lands Act* remained fairly constant.

Retracement surveys, including the integrated survey program, have made appreciable inroads towards this preservation of the survey framework in the agricultural area of the province.

Much progress was made on the survey projects related to the Crown Land Sales Program, especially on the survey of cottage lots.

One hundred and six Plans of Survey affecting Crown lands were examined for the approval of the Director of Surveys.

J. Watling checking traverse closures on Wang Computer

CONTROL SURVEYS AND TOPOGRAPHIC MAPPING

Staff continued to promote the concept of developing a multi-purpose land information network for Manitoba through their participation on a committee established by the Inter-departmental Planning Board, (IPB).

A Provincial Survey System Committee, comprised of representatives from government and industry, was established by the Branch to study and make recommendations for the establishment of a fully integrated provincial referencing system that would support a multi-purpose land information network.

Interim specifications for use by government and private surveyors in surveying townships under The Special Surveys Act were revised.

Specifications were developed for use by government and private surveyors in integrating the geodetic reference framework with the land survey system.

Two hundred survey stations were prepared in the Interlake and Southwestern regions of Manitoba for the future expansion of the Provincial Survey System.

The Special Survey of Township 8, Range 20 was completed.

Technical support for base mapping activities under the Canada/Manitoba Flood Damage Reduction Program continued with reconnaissance work being carried out in Virden and The Pas.

Medium scale 1:20,000 mapping also continued, with 139 pencil manuscripts being compiled, of which 10 were printed and released to the Map Sales Office.

The Computations and Data Unit continued with their program of establishing a computerized positional data file for the Province. A VAX 11/750 mini-computer was installed to assist in this work.

The Branch's Remote Batch Computer Terminal was linked to Manitoba Data Services and Cybershare Limited. It comprised of a key-punch machine, card reader and printer.

GEOGRAPHIC MAPPING

A major project was the preparation of the Manitoba Atlas for which the Cartography Unit prepared 195 full-color maps. The printing and binding of the Atlas was under contract, with specifications and quality control provided by the Branch. It also provided maps for various other purposes, including Manitoba Telephone Mobile Communications, French Language Services in Manitoba and Fire Control Regions of Canada, for a total of 214 single or full color mapping projects.

The photomechanical staff were responsible for providing copies and enlargements of aerial photos, township mosaics, base or special mapping projects and the preparation of rectified mosaics. They prepared all intermediate negatives, color proofs and final printing negatives for the Manitoba Atlas.

The drafting staff prepared a total of 66 plans of legal surveys and boundaries. Other projects included the preparation of new and revised plans for fisheries regulated areas, 6 certified townships for wildlife enforcement and the endorsement of revisions or supplementary data on 265 legal plans.

MAP DISTRIBUTION AND REMOTE SENSING

Service was provided to approximately 15,000 customers. Revenue increased by 38% from $125,700 in 1981/82 to $173,200. Map sales outlets were established with dealers in 35 locations throughout the Province, including the regional offices in Brandon, Dauphin, The Pas, Thompson, Swan River and Portage la Prairie.

The Air Photo Library reached the stage of development where a complete information search centre could be established external from the central library.

The Remote Sensing Centre became involved with a Technology Enhancement Program in cooperation with the Canada Centre for Remote Sensing. The purpose of the program is to test developed remote sensing techniques for natural resources management. The primary data source is Landsat which requires specialized equipment to do image analysis work. Eight new projects were begun in close liaison with resource management specialists.

1983/84

ADMINISTRATION

In the Toponymy Unit, a number of inquiries concerning the accuracy and current local usage of long Amerindian names, prompted staff to conduct a test project in the Sasaginnigak Lake area of eastern Manitoba. The mini-study, involving a local Natural Resource Officer, found that the long names were indeed still in local usage.

The Branch's new computer system added another dimension to the review and dissemination of toponymic data.

LEGAL SURVEYS

The number of Director of Survey Plans deposited in the Branch decreased considerably while the program of registering existing plans of cottage lot subdivisions continued.

Legal survey requirements under the Grand Rapids Forebay Agreement were completed. Surveys under the Northern Flood Agreement commenced at Norway House and Nelson House and similar surveys were scheduled for other communities.

CONTROL SURVEYS AND TOPOGRAPHIC MAPPING

Control Surveys

The provincial survey system, which is designed to support a multipurpose land information network, was extended in southwestern Manitoba and the south Interlake area under the joint Federal/Provincial Inertial Survey Program. A total of 215 survey stations located at or near township corners were targetted, photographed and measured to tie them into the survey system. An additional 205 station sites were selected and prepared for measurement in an area between 50 and 51 degrees latitude west of the Lake Manitoba excluding Riding Mountain National Park.

A geographical referencing framework was established under the Flood Damage Reduction Program in Virden, The Pas, and in the Westwood and St. Norbert areas of Winnipeg.

Computations and Data

A computer purchased in 1982/83 became fully operational in 1983/84 with the transfer of 90% of the application software currently utilized by the staff. This equipment has greatly assisted the completion of the several programs.

The secondary horizontal control survey network in and around the City of Winnipeg was readjusted, with

new data integrated into the network. A number of control survey networks in the rural and hinterland areas were re-evaluated in preparation for the Continental North American re-definition, scheduled for 1985/86. The generation of coordinate values and the management of positional survey data for the cadastral survey system enhanced the Province's computerized positional survey data file.

There were 218 requests for survey related data from other government agencies and private industry.

Topographic Mapping

In the medium-scaled 1:20,000 mapping program, 33 map sheets were completed in eastern Manitoba for the proposed Nopiming Provincial Park and 30 others in pencil manuscript form were completed for the Mineral Resources Division.

Aerial photography inspection was completed on 130 line kilometres for the Flood Damage Reduction mapping program. A total of 25 photo mosaics were constructed for various government departments. Forestry Branch staff used Branch equipment to prepare twenty-five 1:25,000 scale control manuscripts.

Photogrammetric consultation services were provided to various government department agencies including Highways and Transportation, Energy and Mines, Municipal Affairs, Natural Resources and Manitoba Hydro.

An aerotriangulation adjustment program was converted from a main frame computer system to the Branch's in-house VAX system.

GEOGRAPHIC MAPPING

New maps and plans were prepared for various public and departmental purposes including resource use, recreation, land disposition and legal surveys. Major projects completed were the Atlas du Manitoba, Mantario Hiking Trail map, Whiteshell Provincial Park-Land Use map, Groundwater availability map for Virden and Hecla Island areas, and the first new base map for the Forest Protection Tower map series.

Revisions were made to six Crown land maps, the Survey Control Network map, the M.T.S. Mobile Communications map and the Game Bird and Big Game Hunting brochures. A total of 17,464 aerial photograph prints were provided to the Air Photo Library for their clients. Besides legal survey plans others for natural resource use areas and Crown Land administrative boundaries were prepared.

A. Lucidi drafting a Plan of Survey.

MAP DISTRIBUTION AND REMOTE SENSING

Revenue from the Map Sales and Air Photo Library reached a high of $180,700 partly due to the sale of 467 copies of the Manitoba Atlas. Through promotional exhibits, advertising in newspapers and presentations to special interest groups, staff contacted more than 14,500 customers.

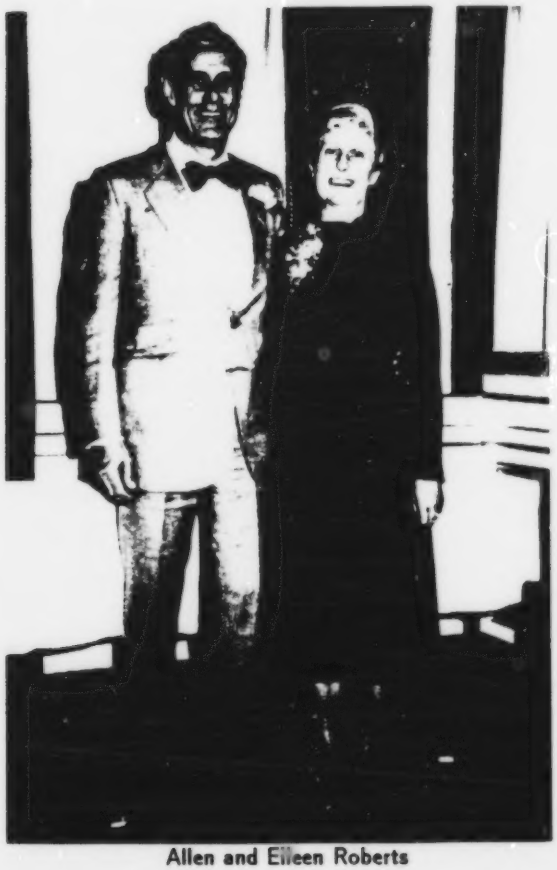
The Remote Sensing Centre became involved in a Technology Enhancement Program (TEP) in cooperation with the Canada Centre for Remote Sensing (CCRS) in December 1982 and since then testing of remote sensing techniques for natural resource management has been conducted. The demonstration projects carried out included crop data monitoring, forest fuel and wildlife mapping, moose habitat inventory, assessing land use/land cover in the Dauphin Lake Fishery and monitoring irrigation activity on the Assiniboine delta aquifer. The projects resulted in continuing the Landsat Image Analysis system with the addition of ARIES-II in March 1984. The Centre is now in a position to provide a continuous Landsat image analysis service. This will prove invaluable to planners and managers in Wildlife, Parks, Agriculture, Forestry, Fisheries, Hydro and others.

An aerial photography search system was established in the Thompson Regional Office which enables customers to view all air photographs from 1950 to 1983.

A.C. ROBERTS RETIRES

On October 31, 1983 Allen Roberts retired after a career of over 30 years in the Surveys and Mapping Branch, fourteen of which he served as the Director of Surveys.

Many collegues and close friends had the opportunity to wish Allen and his wife, Eileen, a long, healthy and happy retirement at a special dinner held in their honour at the Fort Garry Hotel on October 28th.



Allen and Eileen Roberts

1984/85

MANITOBA GEOGRAPHICAL NAMES PROGRAM

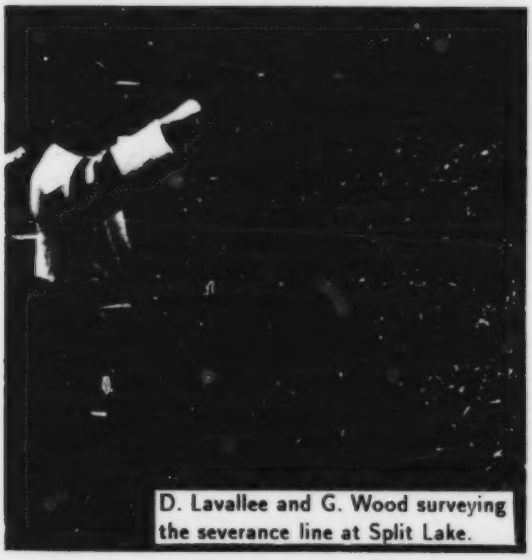
There was extensive media coverage of the naming of features after Manitoba's war casualties and the availability of Commemorative Name Certificates. Liaison with other branches was strengthened, resulting in an increase in demand for research assistance and editing of texts, documents and historical maps.

An independent history researcher visited the office to review nomenclature on maps of Central North America up to 1800. Jack Mercredi, with his knowledge of the Cree language, was able to assist in translating names and verifying their applications on maps.

In November, our Supplementary Name Location Maps were made available in photocopy format to resource officers and other users of this data.

LEGAL SURVEYS

W. Woods and L. Cowan on survey of outline of an Indian Reserve, Saskeram Lake area, June 7, 1984



D. Lavallee and G. Wood surveying the severance line at Split Lake.

This section assists in maintaining the Township Survey System and provides a legal surveying service to provincial departments and agencies. Its tasks include the preparation of plans of subdivision, the survey of rights-of-way for government projects, the survey of miscella-

neous parcels of land, and the investigation and provision of advice regarding land transactions and property disputes. All surveys above the normal capability of the branch's surveyors are contracted to the private sector.

The section is also responsible for preparing instructions and examining all surveys of Crown land carried out by government and private land surveyors.

CONTROL SURVEYS AND TOPOGRAPHIC MAPPING

The provincial survey system, designed to support the geographical referencing of land information was extended to the area west of Lake Manitoba between Latitudes 50 degrees N and 51 degrees N, excluding Riding Mountain National Park. Two hundred stations, located near township corners, were targeted, photographed and measured to tie them into the survey system. An additional 135 stations were selected in southeastern Manitoba for measurement in 1985-86.

Other activities included the selection and measurement of 22 survey stations in the south Interlake region using satellite technology to support an inertial survey research project; the completion of 93 integration surveys between the provincial survey system and the Dominion lands survey system; the commencement of a pilot project to assess the applications of photogrammetric technology in the development of the survey system; and the positioning of seven survey stations by satellite technology in the Souris area.

A co-ordinator for the Land Information Network Advisory Committee was appointed for a two-year term. The L.I.N.A.C. was established to co-ordinate the development of a multi-purpose land information network for the province. Work undertaken included a user-requirement analysis and the development and implementation of an educational strategy to commit users to such a network.

Topographic Mapping

In the medium scaled 1:20,000 mapping program, 16 map sheets for Nopiming Provincial Park, four map sheets of The Pas area and 20 others in pencil manuscript form were completed for the Mineral Resources Division of the Department of Energy and Mines.

In the large-scaled mapping program, nine map sheets at a scale of 1:1,000 covering portions of Winnipeg, and 19 map sheets at a scale of 1:2,000in the Virden (7) and The Pas (12) areas were completed.

Aerial photography inspection was completed for 132 line kilometres of the Souris test project. It is designated to assess the feasibility of using photogrammetry to determine the position of land survey monuments. A total of 20 photo mosaics were constructed for various departments.

Computations and Data

Work centered on the establishment of computer capability for the major surveying programs. This included the computation of positional data for the legal survey system in the province and the preparation of survey observations for the upcoming 1985/86 North American redefinition, readjustment, and subsequent integration of provincial data. Older control survey networks continued to be evaluated and validated and a review of interprovincial boundary data was implemented.

Evaluation of new survey networks in and around the City of Winnipeg continued with the integration of 240 stations. There were 194 requests for positional survey data or related information from other government agencies, industry and the public.

GEOGRAPHIC MAPPING

New maps and plans were prepared and photo products produced for various public and government purposes including resource use, recreation, land disposition and surveys.

Major projects included the preparation of new plans of eight provincial forests, the Atikaki Provincial Wilderness Park, the Assiniboine River Canoe Route, the Northern Interlake Forestry Study, and the Commemorative Name Certificates.

Revisions were made to update the map index, Survey Control Network Map, the Wildlife Management Areas Map, the M.T.S. Mobile Communications Map, and the Game Bird and Big Game Hunting brochures.

MAP DISTRIBUTION AND REMOTE SENSING

Revenue from the sale of maps and aerial photographs to 14,325 customers increased by 10% to $198,400. Photo index systems were established at The Pas and Dauphin to provide these regions with easy access to aerial photography information.

The Technology Enhancement Program (T.E.P.), which tested remote sensing techniques for natural resource management in co-operation with the Canada Centre for Remote Sensing (CCRS), ended in June. An ongoing remote sensing program was established with

the acquisition of the ARIES II image analysis system in March 1984, and an Applicon ink jet plotter in early 1985. The extensive use of this technology in classifying land cover and producing thematic maps is demonstrated by the 37 projects completed.

1985/86

MANITOBA GEOGRAPHICAL NAMES PROGRAM

Highlights included participation in planning a Canadian Native Names Symposium, establishing principles and procedures for the treatment of names shared by Canada and the United States, discussions on the translation and treatment of French Language names, preparation of amendments to the *'Principles and Procedures'* of the Canadian Permanent Committee on Geographical Names, and employment of an Affirmative Action Summer Student for entering data into the *Geographical Names of Manitoba* publication file.

On July 14, 1985 Gerald Holm presented seven Commemorative Name Certificates to the eldest next-of-kin of servicemen from Basswood, Manitoba during the community's Centennial Memorial Day Ceremonies.

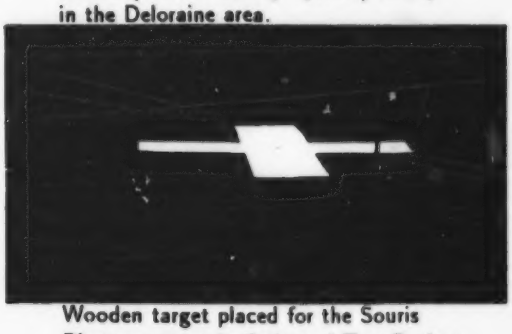
G. Holm presents a commemorative name certificate during the Basswood Centennial Memorial Day - July 14, 1985.

LEGAL SURVEYS

This section continued its retracement of the Township Land Survey System and provided a legal survey service to various provincial agencies.

This included the preparation of plans of subdivision, rights-of-way and parcels and assistance in boundary identification. All surveys that could not be undertaken in-house were contracted to the private sector. Staff prepared the instructions for and examined all such surveys of Crown land.

D. Campbell setting up the Wild T-2 on an ISS (Inertial Survey System) survey in the Deloraine area.



Wooden target placed for the Souris Photogrammetric Cadastral Test Project.

J. Hines checks out the K+E 'Laser Ranger IV' along the special E.D.M. (Electronic Distance Measurement) Base Line, northeast of Stonewall, established for calibrating such instruments.

CONTROL SURVEYS AND TOPOGRAPHIC MAPPING

Control Surveys

One hundred and twenty-five stations were integrated with the Township Land Survey System and an additional 65 stations were prepared for measurement in 1986/87.

Other activities included the completion of all field operations in support of the Souris Test Project. This project was designed to evaluate the feasibility of utilizing photogrammetric technology to maintain the survey system for mapping and land information purposes.

Computations and Data Management

This unit continued to provide computer services and programming support for major surveying and mapping activities.

Three hundred new control survey stations in the Winnipeg area were integrated with existing survey networks, as were 400 township corners in the Township Land Survey System and 250 stations in rural Manitoba.

The computation of positional data for the land survey system in the province continued with 17,500 points being computed to facilitate property boundary mapping in urban centres.

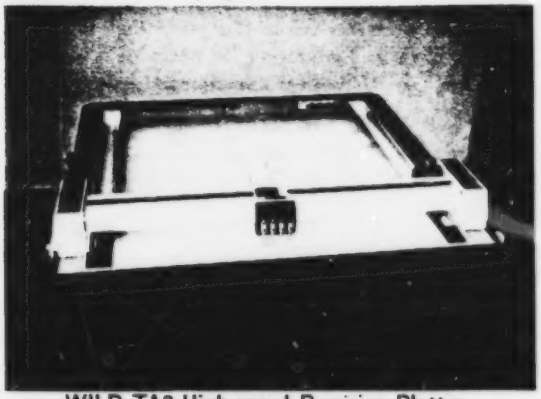
The evaluation of all provincial survey networks continued, with completion of the North American redefinition expected by mid 1986 and provincial network integration of approximately 5,000 existing stations scheduled for completion by mid 1987.

There were 249 requests for positional data and related information from all levels of government, industry and public.

Topographic Mapping

The first phase of the conversion to a digital (computerized) mapping operation was realized with the installation of a WILD TA2 high-speed precision plotter and the initiation of a staff training program.

In the large scale mapping program, provincial standards and specifications were prepared for 1:1,000 mapping. Compilation was completed for 21 map sheets covering the Charleswood/Westwood (8) and St. Norbert (13) areas of the City of Winnipeg. As well, half-metre contours were compiled for 19 existing 1:2,000 scaled map sheets of the Virden (7) and The Pas (12) areas. Approximately 60% of the cartographic work was completed for these projects.



WILD TA2 High-speed Precision Plotter

In the medium scale mapping program, provincial standards and specifications were prepared for 1:10,000 mapping.

Positional information was generated from three separate levels of aerial photography utilizing photogrammetric technology as part of the Souris Test Project designed to evaluate this methodology for survey system maintenance.

In the cartographic unit 338 individual projects were completed for public and government needs, including resource identification, recreation, land disposition and surveys.

Major projects included 74 Electoral Division Maps with Polling Division overprints, five Provincial Forest Plans, nine maps and profiles for the Kenora Ground Water Study, and one Forest Tower Map.

Revisions were made to the Map Index, the Provincial Survey System Index Map, Resource Guideline Fire Maps, the Forest Protection Lightning Strikes Map, three Manitoba Hospital Maps, the Oak Hammock Marsh Brochure, nine Designated Vehicle Route Maps, Municipal and Local Government District Maps and the Canoe Route Index Map.

MAP DISTRIBUTION AND REMOTE SENSING

Map sales outlets operated out of government offices in Portage la Prairie, Brandon, Dauphin, The Pas and Thompson. In addition, maps could be purchased at 42 outlets in private business operations. Some 51,522 maps in total were distributed during the year.

There were 19,152 aerial photographs added to the Air Photo Library bringing its total stock to 700,000 photographs. For users of these valuable resources, which date from 1923 to present, browsing facilities were made available. Considerable use was made

of the library as witnessed by the 3,514 reproduction requests which generated a record 44,000 prints.

The Photo-mechanical lab processed many of the photo products to the Air Photo Library customers. Special services were also provided for mapping programs carried out by the Branch and other government departments. The staff distributed 31,205 air photo and map related products.

Software developments and improvements, combined with the acquisition of an ink jet plotter, increased the capacity to carry out project work. The products produced, utilizing satellite data and image analysis techniques, were widely used by natural resource managers. Project work, using remote sensing technology, was carried out for applications in agriculture, forest fuel type mapping, lake inventories for wild rice development, wildlife habitat mapping, conservation districts management and management planning of provincial parks.

The completion of 37 projects in 1984/85 and 21 in 1985/86 indicated that the centre has shifted from its co-ordinating role to an operational role in its second decade of operation.

MARGARET BARTON RETIRES

On December 23, 1985 an open house was held in the Branch in honour of Margaret Barton on her retirement (December 31st). Several friends and relatives gathered to wish her a healthy, happy and well earned retirement.

Margaret commenced employment with the Surveys Branch on April 17, 1950. During this period she was secretary to four of the five Directors that the Branch had had since it was established in 1930.

Margaret Barton, Secretary to the Director of Surveys

1986/87

ADMINISTRATION

As administration staff are not highlighted as often as they should be for their valuable contribution to the operation of the branch, photos taken of some of them in December, 1986 are included here.

Dave Crandall, Director

Maurice Ratté, Administrative Officer

Bonnie Spooner, Administrative Assistant

Linda Kiselbach, Director's Secretary

LAND DESCRIPTION SERVICES

Legal land description and liaison services were provided for all Crown land transactions such as plans of subdivision, land or mineral exchanges, the Agricultural Land Sales Program and for permits and leases under The Crown Lands Act and The Mines Act. Consents and Orders of the Minister under The Municipal Act and The Municipal Board Act are also provided to expedite the conveyance of mines and minerals for the purposes of land subdivision.

John Hemmerling, Chief, Land Description Services

MANITOBA GEOGRAPHICAL NAMES PROGRAM

Thirty-one World War Fatal Casualty names were applied, highlighted by the naming of *John Osborn Lake* after Company Sergeant Major John R. Osborn, V.C. He was killed in action in Hong Kong in 1941 and was posthumously awarded the Victoria Cross for his heroism and self sacrifice. On December 7, 1986, the Honourable Leonard
Harapiak, Minister of Natural Resources, presented a commemorative name certificate to Major Osborn's son, Captain Gerald Osborn.

On July 15, Dave Crandall attended a dedication ceremony on *Boutilier Island* in Caddy Lake, named after the late David A. Boutilier in recognition of his contribution to the Whiteshell Area. A commemorative name certificate was presented to Mrs. Sandra Boutilier who also unveiled a commemorative plaque.

Jack Mercredi represented Manitoba at the Native Names Symposium held in Ottawa from May 7th to 9th.

An historic and toponymic tour of southeastern Manitoba, which took place on May 31st, was organized by program staff in conjunction with the members of the Canadian Society for the Study of Names.

Two students, Arnold Boldt and Gordon Wikdahl, were employed during the summer for text editing and coordinate digitizing projects.

FIELD SURVEYS

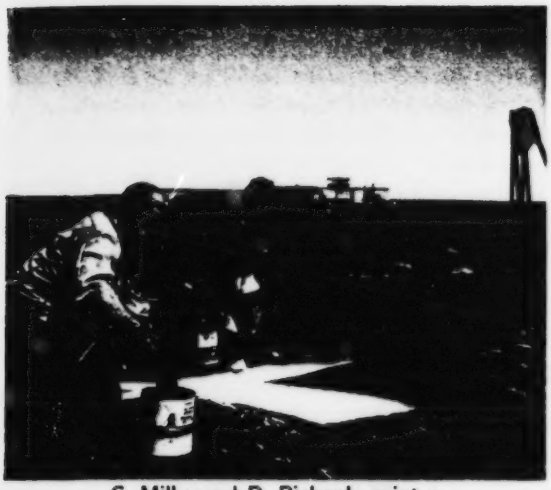
As a result of reorganization within the branch, one section became responsible for both legal and control surveys.

Continued efforts were made in retracement of the Township Land Survey System, the provision of legal surveys to various provincial agencies, and the provision of support for mapping and the geographical referencing system.

Major projects included the Pasquia Lake Polder III project, Oak/Plum Lakes Wetlands Complex, Ste. Rose Flood Protection Program, the Cottage Lot Upgrading Program and the Township 9, Range 6, W.P.M. Special Survey.

The Control Surveys staff established ground control points for two mapping projects to commence in 1987/88. They will be the first to be implemented utilizing the new digital technology.

The first project was carried out from the beginning of April to the end of June and involved the placement of control points in and around the community of Churchill.



G. Miller and D. Richards paint a photo target near Churchill.

G. Lux carries a rifle on survey near Churchill for protection from polar bears.

The second project consisted of establishing ground control points for the southern Manitoba 1:20,000 scaled mapping project. This project covers a 55 township area including the City of Winnipeg and the Red River corridor.

COMPUTER SERVICES AND DATA MANAGEMENT

This section supported the research, evaluation and acquisition of hardware and software requirements associated with the development of "Phase II" of the digital mapping conversion program.

Significant enhancements were made to the Cadastral Positional Data System, CADCOR, and to several other major computer software systems to meet the needs for positional data by a broad spectrum of provincial users. The development and acceptance of a positional data interchange format between the branch and Manitoba Data Services was implemented in conjunction with a geographic information system pilot project (GFIS) involving a number of provincial departments and the City of Winnipeg. Some 25,000 property corners were computed to provide the cadastral base map for the system.

VAX 11/750 computer with disc drive, tape drive and expansion cabinet

Three hundred and seventy-five control survey markers within the City of Winnipeg and surrounding areas were incorporated into existing survey networks and prepared for provincial network integration to be undertaken in 1987/88. All provincial networks will, at that time, be referenced to the new national datum (NAD '83).

Positional values for 6,000 township and section corners were computed to support mapping, resource management, hydro development and other data system requirements both within the department and for external agencies.

The section responded to 272 requests for positional data and related information from several levels of government, industry and the public.

MAPPING

Topographic Mapping

The second phase of a three phase program to convert to an automated mapping operation for the production of topographic, geographic and land boundary maps was completed with the installation of two photogrammetric workstations, one cartographic workstation and a Calcomp drum plotter.

Cartographic work was completed for the twenty-one 1:1,000 scaled map sheets covering the Charleswood/Westwood (8) and St. Norbert (13) areas of the City of Winnipeg and for the nineteen 1:2,000 map sheets covering the Virden (7) and The Pas (12) areas.

An extension to the 1:2,000 mapping at Melita was completed for the Department of Municipal Affairs.

To facilitate communication with map users several display maps were prepared for the proposed Provincial Topographic Base Mapping Program in southern Manitoba, including sample by-products that could be derived from the program.

Geographic Mapping

Geographic mapping services were provided to provincial departments and the public with a total of 183 projects completed.

A sampling of projects included a forest tower map, Cooks Creek and Alonsa Conservation District maps; two Whiteshell zoning maps; legal description maps of a provincial park; three provincial forests and three wildlife management areas; a control survey index map of northern Manitoba; 13 maps for Manitoba Education; nine lake depth charts; six Workplace Safety and Health region maps; and 191 commemorative name certificates.

Revisions were made to four provincial forest maps, the National Topographic System map index, eight designated vehicle route maps, three for the Manitoba Health Services Commission, the Oak Hammock Marsh Land Ownership map, eight maps in the Game Bird - Big Game hunting brochure, three forest tower maps and one Crown lands ownership map.

Plan Drafting

The legal plans of survey, township diagrams and plan revisions were provided by the unit to meet the branch's mandate in maintaining the legal survey framework.

MAP DISTRIBUTION AND REMOTE SENSING

More than 2,000 different maps were available to government personnel and the public through the Map Sales Unit. Province-wide distribution was achieved through government offices in Portage la Prairie, Brandon, Dauphin, Swan River, The Pas, Snow Lake and Thompson. In addition, maps could be purchased at 45 outlets in private business operations. Some 52,255 maps in total were distributed during the year.

J. Martens

There were 12,464 aerial photographs added to the Air Photo Library to update this valuable data source. An aperture card system was maintained to allow for photo research of any area in the province. This system consists of over 2,000 microfilmed flight maps of aerial photography dating from 1923. The flight maps are grouped according to 1:250,000 scaled National Topographic System map sheets. A computer listing identifying everything in the system completes the information decks, fifteen of which are now located in various offices throughout the province, keeping users fully informed on the latest coverage available.

B. Sidoryk

A climate-controlled fire-resistant vault was constructed for storage of air photo negatives returned from the National Air Photo Library in Ottawa. Having the negatives stored on location will greatly improve efficiency and turn-around time for photo prints.

The Photo-mechanical Unit was refitted with new equipment to handle the demand for contact prints ordered through the Air Photo Library. Special services continued for mapping programs carried out by the Surveys and Mapping Branch and other government departments. Some 37,297 air photos and map related products were produced, a 20% increase over 1985/86.

The Remote Sensing Centre completed 16 projects varying in size and complexity from mapping extensive hydro transmission line corridors to identifying gopher habitat in the agricultural regions.

Close liaison was maintained with the Canada Centre for Remote Sensing for identifying applications, new developments and future programs to enhance the use of remote sensing technology in Manitoba.

1987/88

ADMINISTRATION

A *Canada - Manitoba Memorandum of Understanding (MOU) on Geographical Information Systems* was signed on March 3, 1988. The MOU provided for the cooperative development of standards and digital base map data to support topographical and property mapping, as well as, the development of framework components to meet provincial land referencing requirements.

Canada - Manitoba Memorandum of Understanding on Geographical Information Systems (GISs)
(L-R) D. W. Crandall, Director of Surveys; Hon. J. S. Plohman, Manitoba Minister of Natural Resources; Hon. G. S. Merrithew, Federal Minister of State (Forestry and Mines), March 3, 1988.

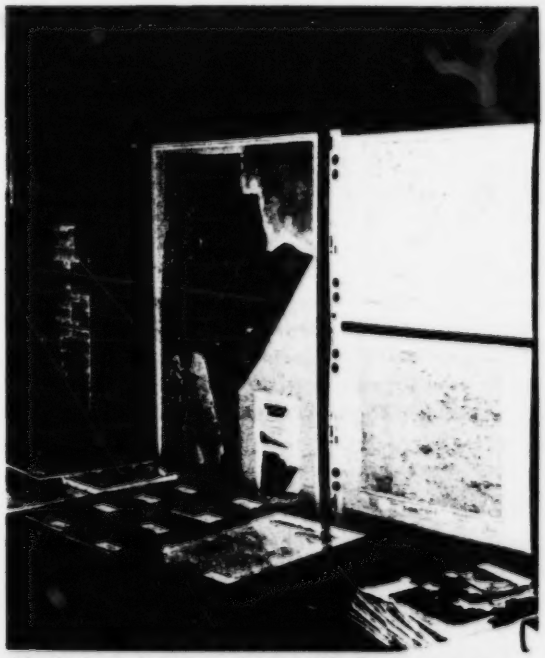
MANITOBA GEOGRAPHICAL NAMES PROGRAM

On May 31st the Minister of Natural Resources presented a Commemorative Name Certificate to Mrs. Eileen Marvin commemorating the naming of *Marvin Island* in Whitemud Lake after her late husband, Frank G. Marvin. As a conservationist, he was instrumental in the establishment of the Forest Interpretive Centre near this lake in the Duck Mountain Provincial Forest.

Major projects included: liaison with all municipal offices to assess the status of names affected by railway line abandonment and to study the phenomena of naming rural roads; reports on specific name reviews for the proposed Kettle Stones Provincial Heritage Park, Birnie Creek/Snake Creek and Dauphin River; Cumulative Supplements to the *Gazetteer of Canada - Manitoba*, 1981 issued on April 30th and December 31st and, the brochure *Manitoba's Geographical Names*, printed to meet the demand for more information on names and their research sources.

Gordon Wikdahl, a summer student, was employed under the S.T.E.P. program assisting in the preparation of commemorative name certificates and the updating of supplementary location maps.

Gerald Holm attended the Fifth United Nations Conference on the Standardization of Geographical Names in Montreal as a Canadian delegate serving on an editorial committee drafting recommendations and resolutions.



Manitoba's display at the 5th UN Conference on the Standardization of Geographical Names, Montreal

Approximately 180 interested guests were given a presentation on the program during the Branch's Open House held on October 22nd and 23rd.

FIELD SURVEYS

In conjunction with the branch mapping program and its integration objectives, retracement of the basic Dominion Land Survey fabric was concentrated south and west of Winnipeg.

Mapping control surveys covering in excess of 100 townships were completed in January assisted by a satellite positioning technology (G.P.S.) contract to establish horizontal control points.

Two field crews spent much of the winter retracing the limits of the Belair and Brightstone Sand Hills Provincial Forests with a line clearing crew provided by the department's regional office.

The survey projects requested by the Lands Branch under their cottage lot upgrading program were processed to the extent that 95% of all plans are at the registration stage.

In the Pasquia Lake Polder III area, the survey fabric and main drain plans were registered with the remaining lateral drains to be surveyed on a priorized basis.

Other major projects completed included the survey of the University of Manitoba property, subdivisions at Sherridon, Brochet and Wallace Lake, and the Big Grass River double dyke system.

COMPUTER SERVICES AND DATA MANAGEMENT

The section continued to support land referencing initiatives and property boundary mapping needs of various provincial and municipal agencies by providing computed positional values for property corners in urban and rural areas. In total 32,000 parcel corners were computed comprising some 13,000 lots and parcels, in such diverse locations as Winnipeg and Churchill. Attribute data such as parcel identifiers were included consistent with requirements for future communication with the provincial Land Titles data base. A continuous property boundary map data base will provide efficient management of the positional and attribute data generated.

Further development was undertaken on several major computer software systems to provide enhanced data capabilities, ease of access and improved efficiencies in positional data development and related data management. The enhancements are expected to improve computational productivity by 35%. The planning and development of systems to support the computation of positional values for some 1300 surveyed townships comprising in excess of 187,000 quarter-section land parcels was initiated. This system provides the land survey framework for the provincial topographical mapping program and forms a foundation for a rural landbased information system.

Two hundred new survey control markers within the city of Winnipeg and neighboring areas were integrated with the National Survey Control System. These support a Manitoba-Winnipeg initiative to establish a cohesive system for 4 surveys within the city for precise mapping and joint referencing needs.

The section responded to 253 requests of varying complexity for positional data and related information from several levels of government, industry, and the public. Exchange of data in digital format with agencies utilizing different mapping and referencing systems has been achieved, primarily with Manitoba Data Services, Manitoba Hydro and Manitoba Telephone System.

Liaison was maintained with the federal and provincial surveying and mapping agencies in the development of standards relating to national datum, positional computations and geodetic data interchange, to enhance the quality of data and its accessibility to all users.

MAPPING

A three year program to establish an automated digital mapping system for the production of topographic, geographic and property boundary maps was completed. The system was built on an existing VAX/VMS 11/750 computer and three Wild stereoplotters. It now includes CARIS digital mapping software developed by Universal Systems Limited (USL), 2 micro VAX II, 3 photogrammetric workstations each comprised of a stereoplotter, a USL controller and a Tektronic colour graphics terminal. Two cartographic work stations have Altek digitizers, while another has only the Tektronic colour graphics terminal. A Wild flat bed plotting table and a Calcomp drum plotter complete the system.

Staff training was completed and output was expected to reach full production in 1988/89.

Topographic Mapping

Topographic mapping of the Churchill area was undertaken and three 1:2,000 scaled maps of the community were scheduled for distribution in August, 1988. Five 1:10,000 scaled maps of Churchill and its environs will be available in early 1989.

The 1:10,000 topographic mapping program in Southern Manitoba was initiated with the acquisition of

6200 square kilometres of 1:30,000 scaled aerial photography covering the Winnipeg-Selkirk area. Data compilation began in January and the first digital and traditional maps were to be available from this program during 1988/89.

Geographic Mapping

Geographic mapping services were provided to provincial government agencies and the public with a total of 127 projects completed. A sampling of projects included: 10 Community Boundary Maps, three Heritage Park Plans, a Photo Mosaic of Hecla Provincial Park, 23 Lake Depth Charts, four Certified Photo Mosaics and four Crop Risk Boundary Maps. In addition, 239 Commemorative Names Certificates were prepared for the Geographical Names Program.

Revisions or updates were made to six Designated Vehicle Route Maps, three Health District Maps, 72 Wildlife Management Area Maps, the Hunting Brochure, the Oak Hammock Marsh Land Ownership Map, the 1:1,000,000 Provincial Base Map and the 1:500,000 Southern Manitoba Provincial Survey System Index Map.

MAP DISTRIBUTION AND REMOTE SENSING

The map distribution network, established throughout Manitoba, was expanded into northwestern Ontario and the northern United States. Changes occurred in The Pas and Thompson outlets where map distribution services were transferred from 7 government offices to private business operations.

(L-R) V. Borkowsky, T. Armstrong, J. Martens, in the Map Sales area

Fifteen projects of varying size and complexity were carried out by staff with the major acquisition and attention given to the Crop Information System, a joint venture with the Canada Centre for Remote Sensing and the Canadian Wheat Board.

The Crop Information System (CIS) was officially launched at a ribbon cutting ceremony on October 22, 1987. The CIS, beginning with the 1988 crop year, will provide users with a quick and reliable method of acreage and yield assessments for major crops around the world.

The centre was awarded a mapping contract by Meadow Lake Sawmill Ltd., to map forest cover across the width of central Saskatchewan. The purpose of this project was to inventory stands of timber within the agricultural fringe zone 8 which have potential for commercial harvest. A total of 24 maps sheets at a scale of 1:125,000 were to be produced during 1988/89 from Landsat Multispectral Scanner data.

One of the Image Analysis Systems was upgraded from a 71 to 500 megabyte disc which allowed for greater capacity to produce data shortly after it arrives from the satellite receiving station.

The centre served the needs of 1479 customers and maintained its monitoring role in identifying new applications and developments of this technology for provincial use.

1988/89

MANITOBA GEOGRAPHICAL NAMES PROGRAM

News and Views

A major research report titled *A Review of the Names Birnie Creek and Snake Creek* led to the changing of the name Birnie Creek to North Snake Creek.

On November 2nd, 1988, Gerry Holm and Jack Mercredi met with a Municipal Histories Committee in Rossburn to resolve a number of names discrepancies and to decide upon the applications of new names. This meeting resulted in thirteen name decisions and six recommendations on names shared by Riding Mountain National Park.

During December, the responsibility for the production of the Commemorative Names Certificates was transferred to the program from the Mapping Section.

Presentations of Commemorative Name Certificates

At the Commonwealth Wartime Aircrew Reunion Banquet held on September 17th, Premier Gary Filmon presented a Commemorative Name Certificate for *Com-*

monwealth Lake to Lt. Gen. L. Ashley, C.M.M., C.D. Air Commander, C.F.B. Winnipeg. Commonwealth Lake, located some 210 kilometres northwest of Churchill, was named on December 27th, 1974 in honour of the British Commonwealth Air Training Plan. Four islands in the lake are named Kangaroo, Beaver, Kiwi and Lion in honour of the trainees from Australia, Canada, New Zealand and the United Kingdom, respectively.

On December 5th, 1988, at a commemorative ceremony in honour of renowned author, Maurice Constantin-Weyer (1881-1964), a presentation of the certificate for *Lac Constantin-Weyer* was made to Andre Fauchon, accepting on behalf of Madame Francoise Constantin-Weyer. Mr. Constantin-Weyer farmed near St. Claude, Manitoba, from 1904-1914. He left Manitoba for war service and, being gravely wounded in battle was unable to return as his convalescence was long. In 1928 he was awarded the most prestigious of French literary prizes, the prix Goncourt for his novel, *Un homme se penche sur son passe.*

G. Holm and J. Mercredi study a Supplementary Name Location Map

FIELD SURVEYS

Vertical and horizontal survey control was established in the area comprising Townships 1-9 and Ranges 1-16 W.P.M. to support 1:20,000 mapping operations and to densify the existing geodetic reference framework. Over 2,500 km of third-order spirit levelling was carried out with 1,600 bench marks being established. Four hundred points of reference were monumented and designated as future aerial photo target locations, most of which were co-incident with existing Dominion Land Survey monuments to enable future cadastral computations.

In conjunction with these control surveys, extensive retracement and re-establishment surveys of the Dominion Land Survey framework were conducted in selected townships. Such surveys were also caried out in other southern areas resulting in several hundred miles of retracement being completed.

J. Hines and G. Miller near Steinbach

A joint Federal/Provincial survey project was carried out as part of a world-wide program to establish accurate orbit parameters for the Global Positioning System (G.P.S.). As a result, geodetic control stations were established in Brandon, Winnipeg and Churchill.

Legal Surveys for Water Control Projects continued to be handled on a priorized basis gauged by the backlog of survey requests and specifically identified needs. Such needs include the perpetuation and protection of the existing Dominion Land Survey framework and the expropriation of property to satisfy the scheduling of a major project. For example, The Dominion City Dykes Protection Survey, initiated in 1968, was finalized during the year. The registration of the plans covering the dykes allowed for the removal of caveats from, and more importantly, the adjustment of taxes on, properties affected by the dyke construction project.

The program of updating cottage lot surveys continued with requests from the Lands Branch. The updating allows for the registration of plans in the appropriate Land Titles Office which ultimately provides a vehicle for the sale of the lots to the public.

Other survey projects included the subdivisions at Baden, Matheson Island, Waterhen, George Lake and Gilbert Plains; the Falcon Lake Riding Stable land parcel; and the registration of the Gimli subdivision and easement surveys.

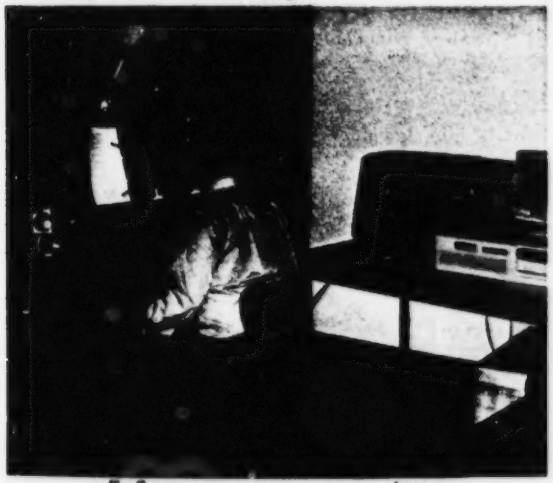
On behalf of the Director of Surveys, staff issued instructions for all land surveys affecting Crown Land and examined all plans of such surveys.

TOPOGRAPHIC MAPPING

Topographic mapping of the Churchill area was completed with the printing of three 1:2,000 and four 1:10,000 colour maps of the community and region, respectively. A fifth 1:10,000 colour plot of the Goose Creek area was also made available on request.

Planning the 1:20,000 Mapping Program
(L-R) R. Lehmann, D. Perry, W. Leeman, B. Hicks

The 1:20,000 topographic mapping program in Southern Manitoba continued with the photogrammetric compilation of topographic features of over 500,000 hectares of land to the north, east and south of Winnipeg. Data validation and field investigation of approximately half this area was also completed. Mapping photography was also acquired covering 400,000 and 500,000 hectares of land to the west and south of Winnipeg, respectively. High level aerial photography was acquired and Photo Maps were produced for 47 Townships south of Winnipeg.



F. Soares operates a stereo plotter
at a digital mapping workstation.

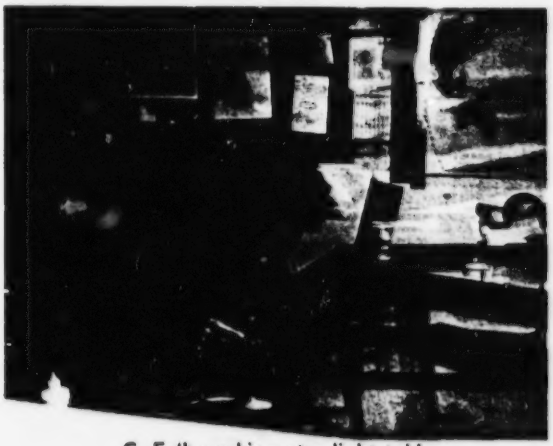
A pilot project of co-operative topographic mapping with the Canada Centre for Mapping was initiated. This project will define Federal and Provincial exchange needs, validate software for the exchange of digital topographic data, support the development of standards and specifications for digital map data, and evaluate the feasibility of digital terrain modeling in low relief areas.

A. Wilson constructing a photo mosaic.

GEOGRAPHIC MAPPING

Geographic mapping services that included the completion of 122 projects involving over 300 maps and plans were provided to provincial departments and agencies

A sampling of these are: Community Boundary Maps (14 maps), Fur Facts Book (46), Red Bartsia Infestation Maps (5), Petes Points Game Bird Refuge, Proposed Provincial Electoral Divisions (4), Buffalo Point Wildlife Refuge, Lake Depth Charts (17), School Division Plans (9), Oak Hammock Marsh (13) and a map of the Nueltin Lake area.



G. Falk working at a light table

Revisions were made to Polling Division Maps (61), Crown Land Maps (4), the City of Winnipeg Base Map (1:30,000), the Porcupine Provincial Forest Map, Designated Vehicle Route Maps and Plans (10), the 1:1,000,000 Municipal and Local Government Districts Map, and eight maps for the Game Bird - Big Game Hunting brochure.

DATA MANAGEMENT

On November3, 1988, representatives of Manitoba and the City of Winnipeg signed a 5-year *Surveying and Mapping Memorandum of Understanding* for the co-operative development of integrated surveying and mapping systems within the City of Winnipeg to support property assessment and other land referencing requirements of immediate interest to the governments of Manitoba and Winnipeg. The memorandum expressed and recorded the mutual desire of both governments to co-operate in developing the essential surveying and mapping components, and in enhancing the public usefulness of the data developed.

Manitoba - Winnipeg 'Surveying and Mapping' Memorandum of Understanding Signing Ceremony ... November 3rd, 1988. (L-R) Hon. Jack Penner, Minister of Natural Resources; Hon. Jim McCrae, Attorney-General; Mayor Bill Norrie, Q.C.

As of March 31st, 1989, the Branch had derived graphical representations and boundary co-ordinates for some 35,000 of the estimated 180,000 land parcels within the City of Winnipeg. In addition, a joint project with the City has been undertaken to develop the digital riverbank data needed to support the parcel boundary program.

Manitoba and the Federal government have introduced a new national horizontal referencing datum called NAD83 for the purpose of upgrading the geographical positions of the existing geodetic (survey control) framework and to base them on a datum more compatible with the size and shape of the North American continent as it is known today. Pending its formal adoption, this new datum will supersede the conventional NAD27 datum through the early 1990's and provide a more precise referencing system for positionally referenced data. During the transition period, the Branch will support transformation of other agencies' and the private sector's NAD27 data with technical information, section staff and appropriate applications software. To date, provisional NAD83 positions have been generated for 1,700 survey control stations in the City of Winnipeg.

Enhancement of existing property boundary computation software was ongoing to provide improved efficiency in positional and graphical data development. The section has also purchased a relational database software program to provide more effective management of Branch data.

B. Bruce

Staff continued to provide ongoing computational support, computer services, applications programming, expertise and data management related to surveying and mapping activities. The section responded to 257 requests from all levels of government, industry and the public for technical information and positional data pertaining to the primary and secondary geodetic reference framework.

Positional data for over 9,000 township section corners have been computed to support referencing needs of Manitoba Hydro and the Forest Inventory Branch.

As of February 1, 1989, the Branch had implemented a dial-up facility to access the Winnipeg Land Titles Office's title database to provide support to the Field Surveys and Land Description Services staff.

MAP DISTRIBUTION AND REMOTE SENSING

Remote Sensing Centre

The Remote Sensing Centre served the needs of 1,310 customers and continued its monitoring role in identifying new applications and developments of this technology for provincial use.

Bill Best (Chief) planning the future direction of Remote Sensing in Manitoba.

The greatest effort over the year went into projects such as the Crop Information System. From April to September 1988, NOAA Satellite Data from the wheat growing areas of Canada and Russia were processed into weekly composites using specially developed computer software programs to produce cloud-free images. As a result of having such technology to process this data, additional projects were awarded to the Centre. Data for all of Canada was compiled into the ten-day composites for the Canada Centre for Remote Sensing. A pilot project was a forest cover map of Manitoba produced for the Canadian Forest Service to be included in the National Atlas. Its success may lead to a contract for a similar mapping for all of Canada.

Remote Sensing Project Planning Session
(L-R) G. Lux, H. Pokrant, D. Busch, R. Dixon

Using data from the Landsat and Spot satellites, project work was carried out for the Canadian Forest Service in Saskatchewan, for Manitoba Hydro, and for the Turtle River Conservation District. The Image Analysis System was used in off-hours by private sector companies and government agencies, not only from Manitoba, but from Saskatchewan and British Columbia as well.

Map Distribution

Through a vigorous marketing plan which included displays at outdoor oriented shows in Winnipeg, Minneapolis and Chicago, the sale of maps rose to 63,000.

A distribution network, accomplished through a cooperative approach with the private sector, was established for making map products readily available to all interested users. There were now 65 outlets throughout Manitoba, Northwestern Ontario and the northern United States, through which new products were made available in a relatively short period of time.

Through considerable investigative work and by negotiating with the Financial Services Branch a "Point of Sale" system was agreed upon and purchased. This system controls sales by programming the cash register with predetermined prices for products, by keeping track of inventory levels and by printing out invoices on credit accounts at the end of each month.

Air Photo Library

The Air Photo Library contained aerial photographs which ranged in age from one year (1988) to 66 years (1923). The entire land mass of the province had been photographed at least once and, in most areas, several times. This was a valuable source for assessing and evaluating the changing landscape. The library would prove to be of increasing value as we moved into a sustainable developmentb approach to the management of our resources.

In 1987 all the negatives of the aerial photographs owned by the province were brought back from the National Air Photo Library (NAPL) in Ottawa. In 1988, the NAPL went one step further and donated the remaining contact prints to the province. Over the year 7,281 of these prints were sold to customers, generating $26,124 in revenue.

Photo-mechanical Lab

There were 32,900 products produced by the photo-mechanical lab in support of the Air Photo Library's customers, Branch mapping programs and other government agencies.

E. Matheson and J. Crone in the photo lab

An arrangement was negotiated with the Federal Government for the long-term use of a Log E printer. With two printers available, backlogs on orders for two printers allowed the lab to produce high quality work.

1989/90

MANITOBA GEOGRAPHICAL NAMES PROGRAM

News and Views

Just over one hundred maps covering northern Manitoba were forwarded to the Inuit Cultural Institute at Arviat (formerly Eskimo Point), N.W.T. These maps are to support a three year (1989-91) toponymic field research programme planned for the District of Keewatin.

Cumulative Supplements to the *Gazetteer of Canada - Manitoba* were compiled and distributed. The June 30, 1989 supplement listed 932 names.

Presentations

A memorial ceremony was held in Lac du Bonnet on April 28th for the victims of a January aircraft accident which claimed the lives of Allan, Lynda and Dale Johnston. The Minister of Rural Development, the Honourable Jack Penner, presented commemorative name certificates for *Allan Johnston Lake* to the surviving member of the family, Kelly Johnston, and her grandparents, Mr. and Mrs. Peter Sol and Mr. and Mrs. Tom Johnston.

On June 24th, in conjunction with the Opening of the MacGregor and District Archives, Assistant Deputy Minister Richard Goulden presented 27 commemorative name certificates to next-of-kin of service personnel from the R.M. of North Norfolk who died during World War II. Also presented was a certificate for *North Norfolk Lake*, named in honour of more than sixty World War I casualties from the municipality. The ceremonies concluded with the presentation of a Special Map of Manitoba, a 1:1,000,000 base map showing all features named after the fatal casualties from the area. This map, prepared by Jack Mercredi, will be on display in the newly opened/archives building.

On October 13th, Gerry Holm presented a commemorative name certificate to Mrs. Leona Corriveau for an island in the Waterhen River, named after the well-known romance novelist, the late Gabrielle Roy. The author was born in St. Boniface, educated in Winnipeg, and taught school in rural Manitoba, particularly in the Waterhen district.

Annual Meetings Hosted by Manitoba

The Annual Meetings of the Canadian Permanent Committee on Geographical Names (CPCGN), held in Winnipeg from September 13th to 16th, were a tremendous success.

(L-R) J. Turnbull and D. Arthur (Saskatchewan), G. Holm and D. Crandall (Manitoba) during the Annual Meeting of the Canadian Permanent Committee on Geographical Names.

The Advisory Committee on Toponymy Research (ACTR) addressed a full agenda dealing with such matters as: a Canada/USA understanding on transboundary feature naming, federal/provincial cooperation in field research, a round table discussion on native names - directed particularly at the question of approving geographical names in native languages, and the development of standardized 'alternate' names. Input to the discussion on native names came from invited guests which included native representatives, linguists, a cartographer (R. Gurney) and a journalist.

Our Minister, the Honourable Harry Enns, participated in the opening of the plenary session on Friday, September 15th. He welcomed to Manitoba the largest-ever gathering of members and invited guests to the twenty-eighth Annual Meeting.

The Friday meeting, chaired by Hugh O'Donnell, Assistant Deputy Minister of the federal department of Energy, Mines and Resources, addressed many issues including: a revision to the existing Order in Council, United Nations activities, transboundary feature names, the five-year strategic plan, names and official languages and toponymic data bases.

Projects/Activities

The slide presentation on Manitoba's Geographical Names was completed.

On July 11, 1989, a field trip was made to Peguis and Fisher Branch to review the local usage of the names Fisher River and East Fisher River. Another one day field trip was made on February 7th, 1990, to the Buffalo Point area to research data related to a proposed name change of Muskeg Bay, Lake of the Woods, to Ka-Ka-Gesick Bay.

In conjunction with the CPCGN meetings, *An Historic and Toponymic Excursion - Winnipeg to Gimli and Environs*, took place on September 16th.

On March 27th, the Minister appointed Gerald Holm as the Manitoba representative on the Canadian Permanent committee on Geographical Names.

Commemoration Lake was named on March 29th to commemorate all those employees who served with the Department of Natural Resources during its first sixty years, 1930 - 1990.

FIELD SURVEYS

The arrival of three Global Positioning Systems (GPS) instruments was an event that could not pass unnoticed. The use of this satellite positioning technology marked a fundamental change in our approach to surveying and presented a major opportunity to simultaneously address land survey system maintenance problems and meet increasing demands for geographically referenced land information. The receivers were in operation by September with production ahead of schedule.

As has been the norm for several years the weather continued to be favourable to field operations, resulting in greatly increased production. Projects worked on include: Metigoshe Lake, Carman Diversion - Phase II, Northern Recreational subdivisions, Paint Lake subdivisions, Norquay Provincial Recreation Park, Vita Drain, Grindstone Drainage Project, numerous combined retracement projects, the easements and diversion surveys at Gimli, The Pas I.R. #21 - I, Dominion Land Survey retracement projects at Morden and Wawanesa, control surveys for the mapping of the Assiniboine and Red Rivers within the City of Winnipeg boundary and several smaller subdivisions and Water Control projects.

D. Richards and R. McIntyre check and establish coordinate values near Headingley for the topographical mapping program.

MAPPING

Topographic Mapping

Topographic mapping completed the monumental task of establishing detailed specifications for their 1:20,000 mapping program.

S. Hanson at his cartographic work station

A total of 510 models have been completed by the Photogrammetric section allowing them to start compiling Year 2 mapping. Aerotriangulation of the Year 2 block was completed. As well, the long awaited Four-Axes Bridging program was implemented, effectively doubling daily bridging output.

Editing and quality control along with field checking has been completed on a total of 14 map sheets.

P. Hurlburt on mapping field completion check in Birds Hill Provincial Park

The shoreline for the entire Red River within the perimiter of Winnipeg has been compiled with a portion of the Assiniboine River to assist Data Management in their City of Winnipeg boundary project.

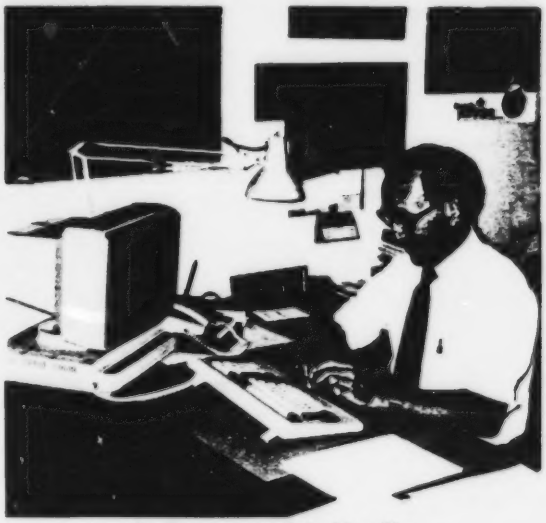
A township photobase map program was initiated at a scale of 1:20,000. A total of 154 of these maps maps were produced for Winnipeg and surrounding areas and made available to the Map Office.

Geographic Mapping

Geographic Mapping services created a number of new maps and plans for public use as well as different government agencies.

J. Larcombe takes time out for this photo

A record number of new projects that were completed included 57 Provincial Electoral boundary maps along with 57 Polling Division maps. There were also a total of 56 School Division and District maps produced. A project requested by MTS Rural Division involved 25 different maps for their telephone directory. Seventeen lake depth charts were completed as well as 11 study maps used for the Oak Hammock Marsh area. Over 80 new survey plans were drafted along with 219 revisions to existing plans.



D. Perry at work in his office

Other revisions included our 1:500,000 base map (Sheet 1), the Oak Hammock Marsh Ownership map and a Resource Guidelines map for Forest Protection. Many other individual maps and smaller projects were also completed for a total of over 600.

DATA MANAGEMENT

Manitoba/Winnipeg Surveying & Mapping Agreement:

Control Survey Network – As of March 31, 1990, some 1850 horizontal control survey markers were in place and were in the process of being integrated with the primary Canadian geodetic framework on the North American Datum of 1983 (NAD83). In addition, 2500 legal survey posts had been connected to the control framework to support the development of a digital positional Cadastre under the terms of the agreement.

Property Parcels – Section staff computed positional data and established boundary and other attribute information for more than 70,000 property parcels. This was 39% of the 180,000 existing parcels within the City of Winnipeg, and will provide the basis for property mapping programs and Land Related Information Systems (LRIS) referencing.

North American Datum of 1983 (NAD83):
Provincial networks on NAD83 were being finalized and the western block adjustments had been targeted for completion by July, 1990. It was expected that NAD83 would be adopted nationally and provincially shortly thereafter, and the values of integrated horizontal control stations published and made available for distribution.

Presentations were made to a number of Departmental Agencies and interested groups on the benefits associated with NAD83 implementation, an its impact on land information managers in particular. These included an overview of datum, co-ordinate systems and mapping projections, specifically the Universal Transverse Mercator (UTM) projection, and their application to such areas as automated mapping and LRIS programs.

Enhanced Technology / Expanded Capability:
The Section acquired a major upgrade to the existing in-house computer system during the '89–90 fiscal year. The new system will provide the Branch with adequate processing power and system flexibility to support its programs well into the next decade. System users within the Branch numbered more than 50, up from 1 in 1970, involved in control and legal survey computations, topographical and property boundary mapping, toponymic activities and a broad range of administrative activities including word processing. Improvements to survey applications software systems, particularly in the area of property parcel development and maintenance, were implemented and further performance ehnancing developments are planned.

D. Barkman

Other Activities:
Section staff were involved in various other activities over the past year, from serving on technical committees and working groups involved in the development of LRIS standards including spatial referencing systems and property boundary database standards, the implementation of the new North American datum, to the computation of co-ordinate information for the provincial township system. The Branch computer system was maintained and computer service and software support was provided to all Branch staff. Data and information was disseminated to all levels of government, Crown corporations and the public, in response to over 200 requests for service.

MAP DISTRIBUTION AND REMOTE SENSING

Remote Sensing Centre

In 1989, Manitoba became a member of the Radarsat Program. Agreement was reached to purchase two complete sets of data for the provincial land mass when the satellite is launched in the mid 1990's. The Remote Sensing Centre will have the responsibility for ordering, storing and distributing this data.

The World Crop Monitoring Program was successfully carried out during the 1989 crop season with a near real time delivery of data. There was over 600 satellite images of the Soviet Union, 200 images of Canada and 52 global images processed. A tape drive and a high speed modem were added to the system for greater efficiency in processing and transferring data to customers.

D. Busch working at the World Crop Monitoring System work station.

The first phase of a two year project was carried out to compile a forest cover map of Canada for the National Atlas Group of Energy, Mines and Resources, Canada. This map will be published in the National Atlas at a scale of 1:7,500,000.

Through a Memorandum of Understanding, Natural Resources and Energy, Mines and Resources, Canada initiated a Radar Data Development Program. It provides the framework to carry out projects and work with radar data and to become familiar with its characteristics on a cooperative basis. The Centre coordinated and assists on project work with other government agencies to prepare users for the launch of Radarsat in the mid 1990's.

G. Lux removing completed map of classified satellite data from the Applicon Ink-Jet Colour Plotter.

Map Distribution

The point of sale system for processing the sale of maps and air photo products became operational in April 1989. The system provided inventory control, issued receipts and generated month end invoices.

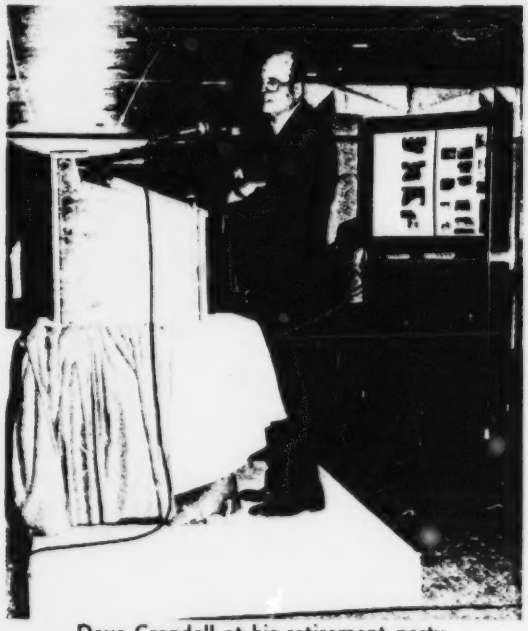
There were 65,388 maps and 30,396 photo products distributed to 13,373 customers generating revenue and recoveries in the amount of $628,867.12.

Photo-mechanical Lab

The lab produced 29,777 products in support of the Air Photo Library's customers, Branch mapping programs and requests by other government agencies.

DAVE CRANDALL RETIRES

A farewell reception was held on December 14, in honour of Dave Crandall's retirement (effective December 31st, 1989). The stand-up buffet was held in the Merrie Monarch Room of the Viscount Gort Hotel and was attended by approximately 150 guests. Murray Foster acted as Master of Ceremonies and invited department executive, branch directors and close friends to say Bon Voyage.



Dave Crandall at his retirement party

THE PHOTOGRAMMETRIC FISHING CLUB

Established by the four founding members...Wilson, Wahl, Pokrant and Lehmann ...in 1977, the Photogrammetric Fishing Club has expanded to a membership of eight, drawing them from several sections throughout the branch. Members are inducted into the 'Royal Society for the Preservation of the Piscatorial Arts'.

The Annual excursions have varied from the initial trip to Black Sturgeon Lake in the Lehmann motor home, to primitive camping on the Winnipeg River, to the luxury of the Wahl Lodge on the Lake of the Woods. The faces and locations may have changed over the years, but the camaraderie and good times are forever...and the food!

In the true nature of sportsmanship, this premiere fishing group, practices catch and release...if you catch one, your partner usually loses it! Several awards have been created over the years, crediting those displaying some angling skills for the largest Northern, largest Walleye, largest Bass, The Almost-A-Master Angler Award for the overall best fisherman, the Tag-Team Award, and finally, the far from coveted, Worst Fisherman Award.

The Photogrammetric Fishing Club Members (1990)
(L-R) R. Lehmann, J. Martens, G. Holm, J. Hemmerling, D. Campbell,
F. Soares, A. Wilson (former member, stands in for B. Davis), F. Wahl

The ones that didn't get away - 1986
(L-R) R. Lehmann, J. Martens, F. Soares

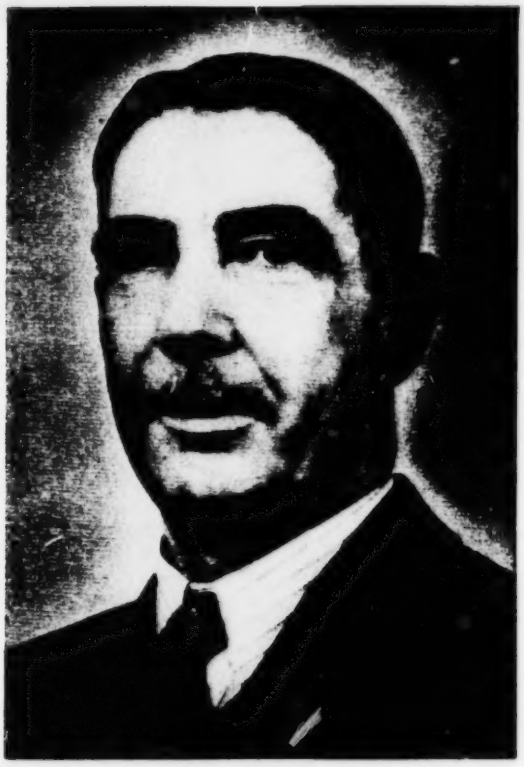
PAST DIRECTORS

S. E. McColl, B.A., D.L.S., M.L.S., S.L.S.,
Director (October1, 1930—January26,1940)

Born in Winnipeg July 17th, 1887, he was educated in Winnipeg public schools and graduated in Arts in 1907 from the University of Manitoba.

Mr. McColl obtained his Manitoba Land Surveyors Commission in 1909, his Dominion Land Surveyors Commission in 1911, and his Saskatchewan Land Surveyors Commission in 1920. He was a member of the Canadian Institute of Surveying, also an associate member of the Engineering Institute of Canada and a member of the Professional Engineers of Manitoba. He was engaged in private practice with his brother, G. B. McColl, from 1912 to 1930, and was President of the Manitoba Association of Land Surveyors for two years, 1929 and 1930. During World War I he served overseas as a Lieutenant with the Canadian Engineers.

Mr. McColl was probably better known as Director of Surveys, a position which he held from its inception in 1930 until his death on January 26th, 1940. Under his direction many important surveys were made and maps published which assisted materially in the development of the natural resources of the province.



H. E. Beresford, M.B.E., M.L.S., D.L.S., M.E.I.C., P. Eng.
Director (February, 1940—July 31st, 1959)

Harry E. Beresford was born on January 4th, 1890 in Dollar Scotland where he received his education. 1908—he left home for Portage la Prairie where he began his training as a land surveyor. He was engaged on Dominion Land Surveys and obtained his commission as a Manitoba Land Surveyor in January 1913 and as a Dominion Land Surveyor in February 1913.

In 1915 he returned to Scotland and obtained Commission as a 2nd Lieutenant in the 10th Battalion—The Cameronians (Scottish Rifles). He was wounded in France in 1916 and was later transfered to the Royal Engineers as O/C 8th Corps. Topographical Section. He was twice mentioned in Dispatches and awarded M.B.E. (Military Division). He returned to Manitoba in May 1919 where he surveyed mining claims.
Employment Data—

February, 1920—Assistant Engineer—Department of Public Works

August, 1920—Inspector of Surveys—Land Titles Office

November, 1930—Chief Inspector of Surveys—Surveys Branch

May, 1931—Assistant Director of Surveys

February, 1940—Director of Surveys
1940—1960 Comptroller of Town Planning, Boundary Commissioner
1940—Member of Land Board, Mining Board, Canadian Board of Geographical Names

1941—46—Director of Travel & Publicity Bureau

1952—Member—Historic Sites Advisory Board of Manitoba

Association of Manitoba Land Surveyors

1925—40 Secretary-Treasurer

1940 and 1941—President

Other Highlights:

1918—Married Jeanetta Morris, they had one son Morris and one daughter Winnifred.

1953—Awarded the Coronation Medal by Her Majesty The Queen.

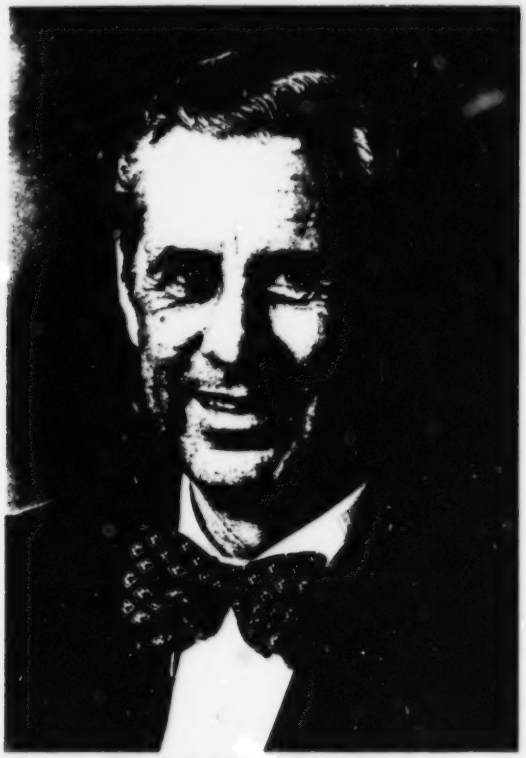
Edward Gauer, B.Sc. (CE), D.L.S., MLS
Director (August 1, 1959—October 31, 1969)

Ed was born and educated in Winnipeg, and graduated from the University of Manitoba in 1926 as a B.Sc. (CE) with honors and a gold medal. In 1927 he was an instructor and did post graduate work on secondary stresses in steel structures. He worked on railway and municipal construction during the summers of 1923 to 1925, and with the Topographical Survey of Canada in the summer of 1926. In 1927 he was employed by the Barnett McQueen Construction Company in Fort William on concrete design and detail and, from December 1927 to June 1932, worked on field surveys with the Manitoba Good Roads Board. He was commissioned as a Dominion Land Surveyor in 1930 and as a Manitoba Land Surveyor in 1931. He was a private surveyor from June 1932 to June 1936 and worked with the Surveys Branch, Manitoba Department of Mines and Natural Resources, from June 1936 until his retirement.

He was a staff surveyor on administration surveys, including a number of base and meridian lines in Northern Manitoba, between 1936 and 1948. He xas assistant to J. W. Pierce, OLS, MLS, on the Manitoba-Ontario boundary survey from Island lake to Echoing River in 1937, and assistant to F. C. Lamb, SLS, on the survey of a portion of the Manitoba-Saskatchewan boundary in 1941. He was in charge of the last stretch to Hudson Bay, on the Manitoba-Ontario boundary with J. G. Pierce, OLS, (son of J. W. Pierce) as assistant, from December 1947 to May 31, 1948. He was promoted to Assistant Director of Surveys on December 1, 1946, and to Director of Surveys on August 1, 1959. Additional duties have included being Interprovincial Boundary Commissioner, Manitoba representative on the Canadian Permanent Committee on Geographical Names, member of the Land Board, member of the Land Use Committee and member of the Mining Board.

He was president of the Manitoba Land Surveyors Association in 1950, and had also served as secretary-treasurer, as registrar and as a member of the Board of Examiners and of various committees of the Association.

Mr. Gauer expanded on the use of the free chaining method on winter surveys enabling the final 167 miles of the Manitoba-Ontario boundary to be completed in one winter season. He was one of the first surveyors to use aircraft in winter surveys, and has always been one of the advocates of winter operations. Techniques developed or improved by him are still being used to advantage. A comment placed on Mr. Gauer's card by the late D. N. Sharpe, MLS, who was in charge of a base line survey in Northern Manitoba in 1934, "100% efficient and very agreeable to work with on a party", illustrates his worth then. He never changed.



Allen C. Roberts, N.Z.L.S., M.L.S.
Director (November 1, 1969 - October 31, 1983)

Allen Roberts was born on December 16, 1922, in Auckland, New Zealand. He received his secondary school education and joined the N.Z. armed services in 1941. After training as an Air Navigator in Winnipeg, and spending a year in England, he returned to N.Z., where he served in a four year apprenticeship under the Surveyors Act, N.Z. He married Eileen MacGregor of Winnipeg in New Zealand in 1946.

After receiving his membership in the N.Z. Institute of Surveying on May 14, 1951, he, his wife Eileen and son Wayne returned to Canada, where he joined the staff of the Surveys Branch, Department of Natural Resources, on August 15, 1951.

He received his commission as a Manitoba Land Surveyor in April 1953.

After Surveys in various parts of the province, including the dedication of the Manitoba-Northwest Territories Boundary during the winter of 1958/69 and 1959/60, he was appointed senior Surveyor in 1962, Assistant Director of Surveys in 1965, and Director in 1969.

On December 18, 1969, Roberts was appointed Interprovincial Boundary Commissioner to represent Manitoba on all matters with respect to the boundaries of the Province. He was appointed a member of the Mining Board on January 6, 1971, and a member of the Canadian Permanent Committee on Geographical Names on December 18, 1969.

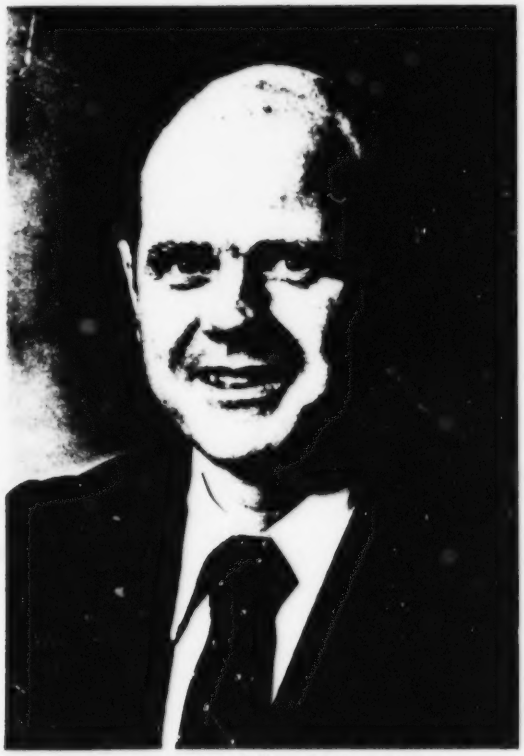
A.C. Roberts served on the Council of the Association of Manitoba Land Surveyors for several years, was secretary-treasurer of the association in 1962 and 1963 and served as president in 1965. He is also a member of the Canadian Institute of Surveying and Mapping and received the "Jim Jones Award" in 1971 for his paper "The Surveys in the Red River Settlement in 1869", which appeared in the June 1970 issue of The Canadian Surveyor.

A.C. Roberts was interested in the education of land surveyors and supported a brief to persuade the government to implement a course in surveying technology at the then Manitoba Institute of Technology. When the course was implemented in 1968, he served as chairman of the Advisory Committee for the Department of Surveying Engineering at the University of New Brunswick for the years from 1972 to 1977, inclusive. In 1972, he also served on a special committee on the D.L.S. Qualifications under the chairmanship of C. Weir (Edmonton). The report of this committee formed the basis for the changes in the D.L.S. and the conversion to the present Canada Land Surveyor (CLS) qualification.

As the need for a western university course in surveying engineering became increasingly apparent, A.C. Roberts became involved in a committee of land surveyors from the four western provinces. As chairman of this committee he prepared a brief, dated June 5, 1977, which was the background for presentations to all western universities and resulted in a course in Surveying Engineering being implemented at the University of Calgary in 1979 to serve the four western provinces. He served as chairman of the Advisory Committee for that course for the four years 1979 to 1983.

During his years as the Director of the Branch, he became aware of the lack of information on Riparian Rights under the Common Law and prepared a compilation of data and of court judgements pertaining to this matter, which was used by many surveyors across Canada.

A.C. Roberts has one daughter, Diane and three sons, Wayne, Grant and Garry.



David W. Crandall, N.S.L.S., M.L.S.
Director (November 1, 1983—December 31, 1989

Dave was born on November 18, 1933,in Dorchester, New Brunswick where he received his early education. He attended the Maritime Forest Ranger School in Fredericton, N.B. graduating in 1952 with a desire to further his education and pursue a career in the field of surveying.

Dave began his career with the Surveys and Mapping Branch in January, 1954 following the completion of a diploma course at the nova Scotia Land Survey Institute. During this early period, Dave was assigned to remote Northern base line and control surveys during the summer. Responsibilities ranged from chainman to complete project responsibility upon receipt of his commission as a Manitoba Land Surveyor in 1956.

He returned to Nova Scotia in 1957 and for two years was in private practise involved in all types of cadastral surveys including extensive experience in boundary disputes and court litigation.

In 1959, Dave returned to Manitoba to oversee business interests and later accepted a position with the Department of Highways. This was also the year in which he married Velma McAllister from Sackville, New Brunswick. They have two sons, Charles and Andrew, and a daughter, Tracy.

Dave returned to the Surveys and Mapping Branch in 1965 and for the next several years was primarily involved in the completion of inter-provincial boundary surveys for the Manitoba-Saskatchewan Boundary Commission. He assumed responsibility for all field operations in 1969, became Chief of Control Surveys and Topographical Mapping in 1980 and Director of Surveys in 1983.

Dave has been committed throughout his career to the goal of ensuring that provincial surveying and mapping systems are developed in an intergrated manner and in fostering a co-operative approach by the surveying community at large.

His involvement in various organizations included:

Canadian Council of Land Surveyors (Past President, Director, Secretary-Treasurer)

National Council on Surveying and Mapping (Member)

Canadian Council on Surveying and Mapping (Past Chairman)

Canadian Institute of Surveying and Mapping (Member)

Canadian Permanent Committee on Geographical Names (Manitoba Representative)

Association of Manitoba Land Surveyors (Past President, Secretary-Treasurer, Chairman of various committees)

Association of Nova Scotia Land Surveyors (Member)

STAFFING ORGANIZATION
SURVEYS & MAPPING BRANCH
1980

THE DIRECTOR AND HIS SECTION CHIEFS

MEMBER OF:
Provincial Boundaries Commission; Canadian Permanent Committee on Geographical Names; Mining Board; Canadian Council on Surveying and Mapping

A. C. ROBERTS
DIRECTOR OF SURVEYS

RESPONSIBLE FOR BRANCH MANAGEMENT:
Policy
Organization
Direction
Budget
Review
Staffing

J. J. HEMMERLING
ADMINISTRATION

M. Q. FOSTER
LEGAL SURVEYS

D. W. CRANDALL
CONTROL SURVEYS
AND
MAPPING

D. E. PERRY
GEOGRAPHIC MAPPING

W. G. BEST
MAP DISTRIBUTION
AND
REMOTE SENSING

A. C. Roberts

M. H. Barton

B. J. Spooner

J. J. Hemmerling

RESPONSIBILITY CHART

Financial Co-ordination
Personnel Documentation
Preparation of Legal Descriptions, Consents and Orders of the Minister
Provision of Land Description Liaison Service to all Levels of Government and the Public
Administration of the Provincial Geographical Names Program

TOPONYMY

G. F. Holm

J. B. Mercredi

GEOGRAPHIC MAPPING

RESPONSIBILITY CHART

Base and Thematic Mapping, Photomechanical Services, Plan Drafting

Geographic Map Compilation Services
Legal Map and Plan Drafting Services
Photomechanical Mapping Components Services
Map Printing Liaison
Evaluation of New Technology

D. E. PERRY

CARTOGRAPHY

F. Engel

W. C. Lucas

S. B. Hanson

M. M. Collins

M. G. Traynor

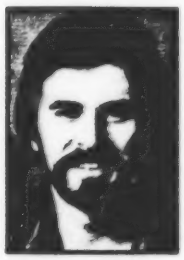
R. J. Bagot

G. B. Falk

DRAFTING

S. J. Larcombe

A. Lucidi



A. F. Wiebe

PHOTO MECHANICAL

S. L. Gregory

J. P. Barlow

J. M. Crone

R. E. Lee

D. W. Crandall

CONTROL SURVEYS

F. W. Leeman

COMPUTATIONS & DATA

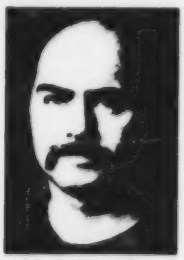
L. S. Brooks

J. G. Watling

J. E. Taylor

M. K. Finnie

D. D. Sinnott


D. L. Lavalee

J. Rosset

D. R. Tanner

G. R. S. Fraser

W. E. Woods

G. R. Miller

W. Krasnikoff

D. J. Barkman

K. G. Fennig

D. A. Richards

M. D. McKinnon

TOPOGRAPHICAL MAPPING

D. A. Steeves

RESPONSIBILITY CHART

Establishment and Maintenance of Survey Control System and Integration
Maintenance of Co-ordinates for Land Survey and Mapping Systems
Dissemination of Control Records and Data
Service to Inter-departmental Committee on Aerial Photo and Photogrammetric Mapping, Including Specifications and Co-ordination
Development of an Auto-mapping Program, Including Digital Technology
Maintenance of Branch Computer Services, Including Software Development
Topographical mapping Services
Administer Manitoba Northlands Surveys and Mapping Program
Evaluation of New Technology
Liaison with Canada and Private Industry on Control Surveys and Mapping

PHOTOGRAMMETRY

R. S. Lehmann

CARTOGRAPHY

R. J. Gurney

F. M. Wahl

A. Wilson

H. L. Sabourin

K. W. Kowalski

G. A. Lux

K. J. Sabourin

F. J. Soares

D. D. Campbell

P. J. Hurlburt

M. Q. Foster

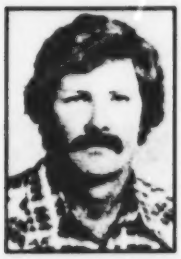
W. M. Ferrand

NORTHERN AFFAIRS
&
SPECIAL SURVEYS

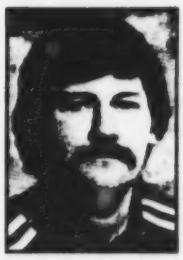
I. Colek

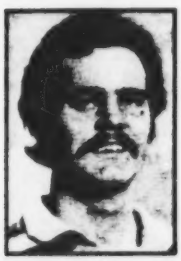
PARKS &
CROWN LANDS

P. S. Eluik


I. D. Robertson

B. E. Davis


R. D. Richardson


R. W. Cederwall

T. M. Tataryn

L. E. Cowan

RESPONSIBILITY CHART

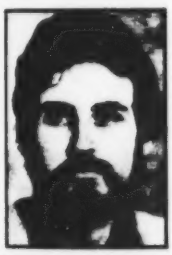
Water Control, Parks, Crown Lands, Northern and Maintenance Surveys

Land Surveying Services to Government Departments
Preservation and Maintenance of Land Survey System
Provision of advice on (Crown) Cadastral Surveys
Specifications and Contracts for Legal Surveys
Liaison with Land Titles Office and Canada Surveys Office
Evaluation of new technology
Administration of Survey and Land Information Centre
Examination of Crown Land Survey Plans

J. C. Roux

WATER CONTROL & WATER SERVICES BOARD SURVEYS

G. S. Hawryluk



D. M. R. Hoplock

N. Rostkowski

G. J. Landreville

G. J. Wood

J. R. Armit

R. E. Einarsson

MAP DISTRIBUTION & REMOTE SENSING

RESPONSIBILITY CHART

Map Office, Air Photo Library, Remote Sensing Centre. Supplementary Photography

Maintenance of Provincial Air Photo Library
Maintenance of Provincial Map Distribution Services
Maintenance of the Manitoba Remote Sensing Centre
Monitoring and Co-ordination of Remote Sensing Activities
Provision of Supplementary 70mm Aerial Photography Services

W. G. BEST

MAP DISTRIBUTION

A. Pastars

REMOTE SENSING

R. J. Dixon

SUPPLEMENTARY AERIAL PHOTOGRAPHY

H. T. Pokrant

T. Armstrong

L. M. Bracken

S. A. Weselake

B. W. Kerr

A. J. Sandy

S. P. Sadonick

D. B. Forrester

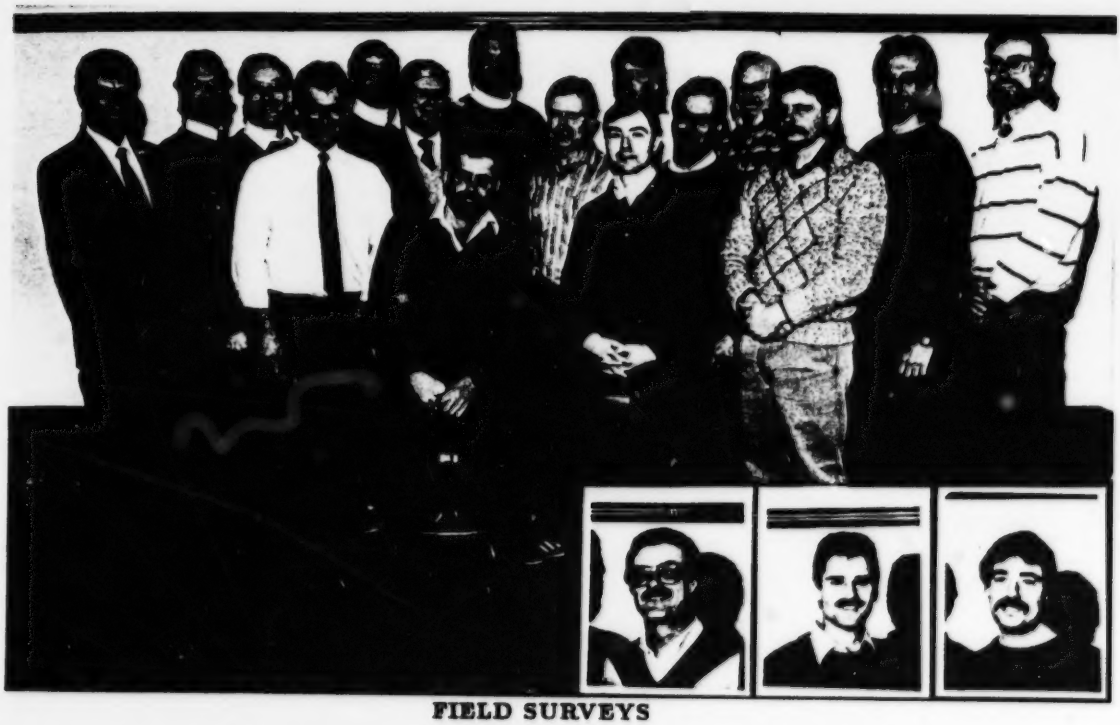
STAFFING ORGANIZATION IN 1990

SURVEYS AND MAPPING BRANCH MANAGEMENT TEAM

(L-R) Lorne Brooks, Maurice Ratté, Bruce Hicks, Wayne Leeman (Director), Gerald Holm, John Hemmerling, Murray Foster, Bill Best

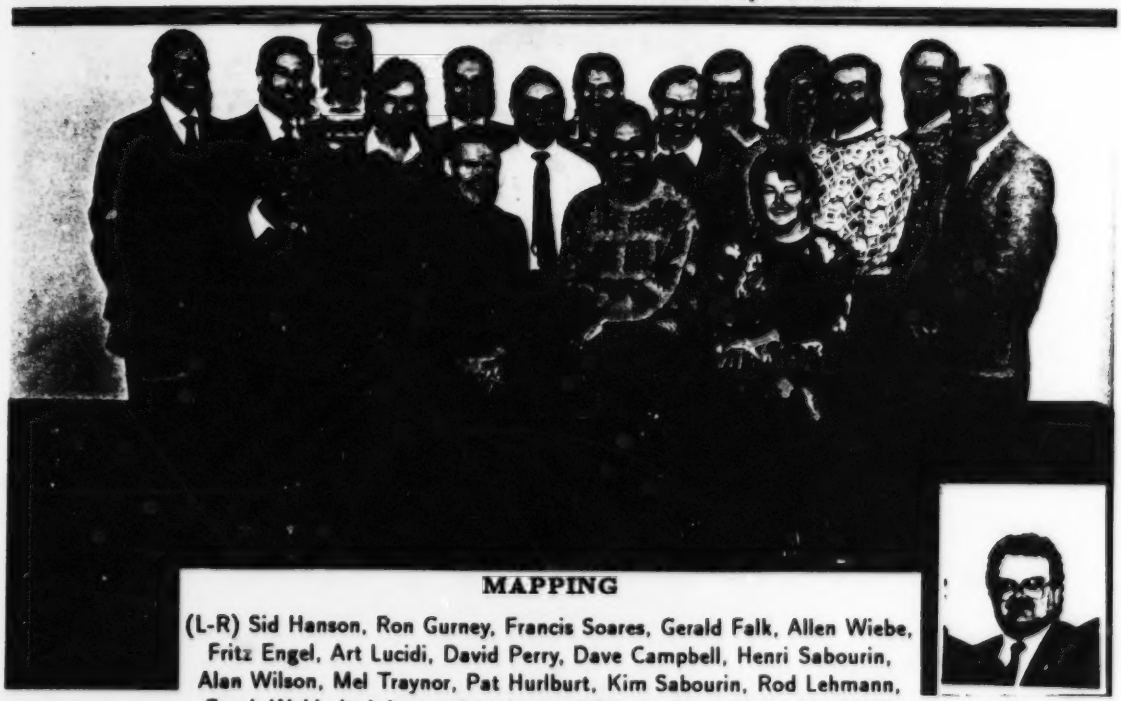
ADMINISTRATION

(L-R) John Hemmerling, Claudette Blunderfield, Gerald Holm, Jack Mercredi, Ruth Honeygham,, April Welter, Wayne Leeman (Director), Maurice Ratté



FIELD SURVEYS

(L-R) Gerald Hawryluk, Wayne Ferrand, Jim Watling, Neil Rostkowski, Ian Bowman, Murray Foster, Gerald Miller, Dale Richardson, Igor Colek, Dave Richards, James Hines, Blair Isaac, Bernie Davis, Bob McIntyre, Paul Burtnick, Dewey Hoplock, Inserted Photos: Ian Robertson, John McLean, Gwyn Griffiths



MAPPING

(L-R) Sid Hanson, Ron Gurney, Francis Soares, Gerald Falk, Allen Wiebe, Fritz Engel, Art Lucidi, David Perry, Dave Campbell, Henri Sabourin, Alan Wilson, Mel Traynor, Pat Hurlburt, Kim Sabourin, Rod Lehmann, Frank Wahl, Jack Larcombe Inserted Photo: Bruce Hicks (A/Chief)

DATA MANAGEMENT

(L-R) Bob Bruce, Jim Taylor, Derek Lavallee, Rae Armit, Doug Barkman, Malcolm Finnie, Lorne Brooks (Chief), Paul Eliuk, Rae Tanner, Dave Sinnott

MAP DISTRIBUTION AND REMOTE SENSING

(L-R) Ed Matheson, Jacquie Crone, Dave Busch, Gerald Lux, Bill Best (Chief), Roy Dixon, Sue-Ann Norton, Valerie Borkowsky, Mariette Allen, Betty Sidoryk, Hartley Pokrant, Judy Boulton, Bob Lee

Inserted Photo: Terry Armstong

BRANCH STAFFING

This history would not be complete without a listing of the Branch's greatest asset - its staff . A lack of continuous records made it impossible to trace all employees back to 1930. Many of those early staff have been identified in the photographs and text. The available attendance records were used to compile the data on the following pages. Those term staff who occupied permanent positions are also included.

Note: **Name** = current staff *Name* = former staff

As of April 1, 1956, the following employees' names appeared on the attendance record:

Name	Classification
Clive Armstrong	Draughtsman I
Pat Baldock	Engineer I
Margaret Barton	Clerk-Steno II
Harry Beresford	Director
Lionel Boutilier	Engineer III
Dave Crandall	Engineer III
Percy Crealock	Storekeeper
Ed Gauer	Engineer V
Jack Larcombe	Draughtsman I
Rollie Matheson	Photogrammetrist
David Perry	Draughtsman I
Ernie Ramsay	Draughtsman III
Allen Roberts	Engineer III
Leo Simoens	Clerk I
Ted Stevens	Engineer III
Jack Stewart	Engineer III
Bob Turnbull	Tracer
Jean Watson	Clerk-Steno III

The following list records those persons who commenced their employment with the Branch between April 1, 1956 and March 31, 1990.

1956

John Beck
Murray Foster
Nils Lindberg
John Thomson

1957

Allan Baty
Jack Countryman
Jim Morse
Gerry Sawyer
Al Srutwa

1958

Lorne Brooks
Bob Gale
John Klaponski
Bill McCulloch
Ed Plezia
Clayton Rolly

1960

Dick Bastin
Dave Lane
Norm Patton
Ron Schaeffer

1961

Donna Grabowski
Collin Lewis
Don McTavish
Phil Peloquin

1962

Mark Kuzik

1963

Ken Veal

1964

Ian Bowman
Fred Eldridge
Ron Gurney

1965

Fritz Engel
Art Johnson
Carol Paluk
Diane Riby
John Taggart
Les Will

1966

Terry Armstrong
Ken Baley
Barrie Flower
Bill Krasnikoff
Rod Lehmann
Henri Sabourin

1967

Walter Beard
Robert Braine
Sid Hanson
Larry Jones
Art Lucidi
Norman Peterson

1968

Hans Arnold
Austin Atkinson
Bruce Moore
Walter Schwarzenau
Heinz Thaler

1969

Igor Colek
Allan Hayward
Yvonne Lederer
Frances (Pike) Mellen
Renate Prochazka
Orest Recunyk
Claude Roux
Jim Taylor
Mel Traynor

1970

Norma Alksne
Jim Armitage
Richard Bagot
Bernie Davis
Gerald Falk
Gerry Miller
Hartley Pokrant
Larry Penonzek
Duncan Robertson
Tommy Shuit
Rae Tanner
Alan Wilson

1971

Doug Barkman
Bob Douglas
Paul Eliuk
Gary Fraser
Gerry Holm
Dale Richardson
Ian Robertson
Alan Wiebe

1972

Warren Kaminsky
Dorothy Kelba
Wayne Lucas
Michael Pearson

1973

Daphne (Van Engel) Allec
William Blair
Marilyn Bracken
Trevor Curtis
Walter Fuchs
John Gibson
George Kolba
Bob Lee
Bonnie (MacLeod) Lenton
Ray Michalenko
Morris Monita
Dave Pihulak
Kim (Strike) Sabourin
Robert Smeall
David Steeves
Russell Strutt

1974

Bill Best
Michael Broadbent
Ed Desharnais
Wayne Dow
Wayne Ferrand
Grace Goodrich
Richard Gougeon
David Haddad
Robert Harris
Gerry Hawryluk
Dewey Hoplock
Steve Korotash
Derek Lavallee
Wayne Leeman
John MacKinnon
David McIntosh
Dave Mitchell
Brian Ridler
Weldon Underhill
Stan Wake
Dan Wasyliew

1975

Daniel Borden
Alan Cass
Malcolm Finnie
Paul Godard
Sharon Gregory
Heather Gunn
James Haggerty
Thelma Hince
Pat Knipe
Ken Kowalski
Steve Lawson
Nancy MacIsaac
Don Martin
Allan McCulloch
Doug McEwen
Gregory Pay
Garry Richardson
Neil Rostowski
Gerald Soulodre
Ronald Spence
David Stevens
Bruce Strike

1976

Rae Armit
Joffre Barlow
Steve Bossenmaier
Giselle Cote
Roy Dixon
Marcia Faurer
Robert Gardener
Carol Hawryluk
John Hemmerling
Gilbert Landreville
Gerald Lux
Jack Mercredi
Dewar McKinnon
George Puttaert
Barbara Silversides
Dave Sinnott
Charles Tinguely
Frank Wahl
Jim Watling
Warren Woods

1977

Sue Ann (Weselake) Norton
Susan Carvery
Enid Christoff
Gilbert Richard
Arlene Sandy
Howard Stewart
Taras Tataryn
Chris Thorkelson

1978

Ray Cederwall
Bonnie (Cheadle) Spooner
Larry Cowan
Klaus Finnig
Maria Fenyvesi
Ken Landry
Jean Rosset
Larry Syring
Greg Wood

1979

Jacqueline Crone
Sandra Forbes
Susan Sadonick

1980

Dave Busch
Dave Campbell
Maureen Collins
Bob Einarson
Don Forrester
Pat Hurlburt
Bruce Kerr
Al Pastars
Dave Richards
Frank Soares

1981

Joyce Abuda
Bob Bruce
Anita Chase
Bruce Hicks
Blair Isaac
Hideya Moniwa

1982

Valerie (Gooch) Borkowsky
Paul Burtnick
John McLean
Betty Sidoryk

1983

Bob McIntyre
Maurice Ratté

1985

Edithe Fillion
Jim Hines
Max Wheaton

1986

Judy Boulton
Gerry Brosniak
Chris Coals
Cindy Foster
Gwyn Griffiths
Sandra Hemmerling
Jadwiga Jurkiewicz
Jake Martens
Ed Matheson
Alice Yuen

1987

Margaret Fries
April Welter

1988

Mariette Allen
Claudette Blunderfield
Kantee Persad

1989

Melba Allen
Lisa Gabel
Ruth Honeygham
Lori Sumner

1930—1980

Field Surveys (Extracted from card files)

Please note:
The following data was extracted from record cards for reference only. No attempt was made to verify the surveys nor the surveyor's names.

NO./Yr 1930—32

1/31 Mining Control, Northern Man. Jan.—Mar./31—R.A. McLellan
2/31 Mining Control, Central Man. Jan.—Apr./31—G.E. Webber
3/31 Mining Control, Central Man. May—Aug./31—G. E. Webber
4/31 Boundary Survey, Whiteshell F.R. May—July/31—D.E. Denmark
5/31 Dauphin River Power, July—Nov./31—D.E. Denmark
6/31 Control Survey, Churchill —G.H. Herriot
7/31 Boundary Survey, Whiteshell F.R. Jun,—Aug./31—J.F. Hyde
8/31 Headingley Trail Invest. Survey
9/31 Churchill Townsite Survey

1932—33

1/32 Public Sht. Grds. South Lake Man.
2/32 Falcon Lake Summer Resort
3/32 Misc. Internat. Peace Garden
4/32 Whiteshell F.R. Summer Resorts
5/32 Resurvey, Parish Ste. Agathe
6/32 Thomas Halfbreed Settlement
7/32 Man.-Ont. Bdy., Wpg. R. to 12 th B. L. Man.-Ont. Bdy., Wpg.River to Intl. Bdy.
Pt. Whiteshell F.R. Bdy. across Twp. 8, Rge. 17 E.
9/32 Churchill Townsite
10/32 Overflowing River, Marsh Area
11/32 Cranberry Portage Acreage Lots
12/32 Portion Bdy. Whiteshell
13/32 Whiteshell Game Preserve
14/32 Gillam Townsite
15/32 Island Lake Control
16/32 Island Lake Meridian
17/32 Resurvey traverse Red River, Moose Lake and Middlebro

1933—34

1/33 Pub. Shtg. Grds. S. Lake Wpg.
2/33 Lakes, Whiteshell F.R.
3/33 Pub. Shtg. Grds. S. Lake Man.
4/33 Winnipeg River—D.E. Denmark
5/33 Fishing Sites, Lake Wpg. Warrens Landing
6/33 Oak Island Marsh, Lac du Bonnet Airport —H.E. Beresford
7/33 Whitemouth and Birch Rivers Drainage
8/33 Steep Rock Marsh Dom. Forestry Expert'l. Area, Duck Mtn.
9/33 Spruce Woods Game Preserve
10/33 Sandilands Forest Reserve Boundary
A/33 Retracement Parishes St. Vital, St. Norbert and Ste. Agathe
B/33 Resurvey of Range line between 17 and 18, Twp. 25W.
C/33 Retracement, Headingley Trail
D/33 Retracement , Twp. 14, Rges. 5 and 6W. Pub. Shtg. Grds. S. Lake Man.

1934—35

1/34 Misc., Brokenhead and Selkirk Asylum
2/34 Retracement, Ste. Agathe, St. Norbert & St. Vital
3/34 Sandilands Forest Reserve
4/34 Whiteshell Forest Reserve —Road
5/34 Spruce Woods Game Preserve
6/34 Summer Resort & road, Whiteshell
7/34 Leveling Operations, Marchand
8/34 Retracement, Twps. 14, 15-8E.
9/34 Retracement, Sec.3-18-21W.
10/34 Ilford & Thicket Portage
11/34 Brunne Lake and Flin Flon Insp.
12/34 Pub. Shtg. Grds. S. Lake Man.
13/34 Gods Lake Base Line
14/34 West Shoal Lake Game Preserve
15/34 Outline Survey, The Pas
16/34 Line between E. & W.½ 30-16-5E.
17/34 Outline Survey, The Pas

1935—36

1/35 Reconnaissance, The Pas
2/35 Retracement, Parishes, Ste. Agathe, St. Norbert, St. Vital, Kildonan
3/35 Airport near Vivian
4/35 N. Boundary S½ 15-4-10E.
5/35 Retracement, Twp.14, 15-8E.
6/35 S. of Lake Manitoba
7/35 Fort Ellice Trail—inspection survey
8/35 Turtle Mtn. Game Preserve
9/35 Retracement, Twp.10-6W
10/35 Herb Lake Townsite
11/35 West Shoal Lake Game Preserve
12/35 Gods Lake Townsite
13/35 Pikwitonei Townsite
14/35 Vista Townsite
15/35 Property at Brandon
16/35 Marsh Areas East of The Pas
17/35 18th Base Line between Prin. & 2nd Meridian E.
18/35 Kinosota—Siglunes Levels

1936—37

2/36 Silver Falls Subdivision
3/36 Duck Mtn. Game Preserve Bdy.
4/36 The Pas marsh Area
5/36 Man.-Sask. Bdy.
6/36 Retracement
7/36 Spruce Woods Game Preserve
8/36 Brereton Lake Subdivision
9/36 Islands in Lake Manitoba
10/36 North Star M.C.'s

1937—38

1/37 Retracement
2/37 Marsh Area Development
3/37 Cold Lake Townsite
4/37 Red Deer Subdivision
5/37 Sec. 18-25-17W. & insp. Red Deer lake
6/37 Lakes, Twp. 5, Rge. 9W.
7/37 Sandilands Forest Reserve
8/37 Westbourne Settlement
9/37 Dam Sites, Melita
10/37 Summer Resort Lots at Falcon & Brereton Lakes
11/37 Brereton Lake Road
12/37 Base Lines and Meridians Central Manitoba
13/37 Survey for Indian Dept. Muskrat Lease

1938—39

1/38 Retracement Survey Parishes, Headingley and Ste. Agathe
2/38 Westbourne Settlement
3/38 Base Line and Meridians Central Manitoba
4/38 The Pas Muskrat Area
5/38 Retracement, Parish of St. Clements
6/38 Flin Flon Summer Resort Manistikwan Lake
7/38 Wanless
8/38 Township 55, Rge. 26W.—The Pas
9/38 Subdivision—Great Falls
10/38 Traverse, Brokenhead River
11/38 Lot 84, St. Andrews
12/38 20th Base Line East of 2nd Meridian East
13/38 Traverse of Islands in Winnipeg River, Lac du Bonnet

1939—40

1/39 Westbourne Settlement, Parish of St Clements
2/39 Parishes of St. Francois Xavier and Baie St. Paul
3/39 Special Survey S.E. 7-14-23W. Hamiota
4/39 Summer Resort Survey, Whiteshell Forest Reserve
5/39 Base Lines and Meridians Central Manitoba
6/39 Stuartburn Survey
7/39 Lakeview Municipality, Langruth
8/39 Trans. Line Morris Dom. City
9/39 Wanless, Hill Is, Lake Athapapuskow summer resorts
10/39 Parish of Lorette
11/39 S.W.¼ 10-12-16E. Whiteshell F.R.
12/39 Village of Sprague
13/39 23rd Base Line
14/39 Twp. 23, Rge. 9W. Vogar
15/39 Great Falls Subdivision

1940—41

1/40 Man. Home for Boys, Portage la Prairie
2/40 Subdiv. Twp. 55, Rges. 27 & 28W The Pas
3/40 Retracement, Parish of Baie St. Paul
4/40 Connolly Lake Muskrat Area E. Gauer, M.L.S.
5/40 Whiteshell F.R.—Brereton, Caddy & West Hawk Lakes D.N. Sharpe M.L.S.
6/40 Fisher Bay—Sturgeon Bay Muskrat Rehab. Project Wm. Hayward
7/40 Inspection Brandon Dam F.A. Dagg
8/40 Retracement—Twps 16 and 17, Rge. 9E.—D.N. Sharpe M.L.S.
9/40 Reconnaisance—H. Halcrow

1941—42

Survey, M.G.A.S. Buildings, Lac du Bonnet

1941—42

Survey, M.G.A.S. Buildings, Lac du Bonnet
1/41 Leaf River—Berens River Area (Muskrat Developement)
2/41 Lakes in Whiteshell F.R.
3/41 Whiteshell Forest Reserve
4/41 Fishing Areas—Lake Manitoba
5/41 Lake Winnipeg—Hecla Island
Fisher River Fur Rehab. Block Man.—Sask. Boundary
Misc. Shelley Bog—D. N. Sharpe

1942—43

1/42 Baie St. Paul—Retracement
2/42 Whiteshell—Sport Fish Hatchery
Misc. Gimli—Fishing Lease
Hay Lease—Sec. 26-16-6E.
Investigation Survey—Road allowance—North of Rennie
Lake Traverse, Twp. 20-26W.
Lake Manitoba—lines re fishing areas.
Fisher River Fur Rehab. Block

1943—44

1/43 Retracement Survey—Spruce Woods Twp. 9, Rge. 14W.P.M.
2/43 Jessica Lake—Subdiv. of Lots Whiteshell F.R.
3/43 Retracement Survey—Parish of St. Francois Xavier & St. Paul
4/43 Survey of Govt. Buildings in Man. for "Titles to Lands and Buildings Committee"
5/43 Fisher River Fur Rehab. Block
Misc. The Pas, Twps 55 & 56, Rges. 26 & 27W.P.M. Bracken Dam Site
Silver Falls—Subdiv. Lots
Frog Point—Applic. for Fishing Site—Twp.29, Rge. 5E.
L. Salle River—Twp. 8, Rges. 1 and 2E.P.M.
Inspection of muskrat area E. of The Pas—E. Gauer
Lac du Bonnet—Revetment Wall
Investigation of Bldg. N.W. 33-21-4E.
Big Grass Marsh Survey
Netley Marsh—defining Bdies.
Whiteshell Prov. Park Survey

1944—45

1/44 Prel. Survey—Netley Marsh
2/44 Prel. Survey Delta Marsh
3/44 Prel. Survey Duck Mountain F.R.
4/44 Meadow Portage & Waterhen River
5/44 Fisher River Fur Rehab. Block
6/44 Subdiv. Twps. 53 & 54, Rges.27 & 28W.
7/44 Whiteshell Summer Resort Lots (recreational development)
Misc. Whiteshell (Green Lake)—Fishing Camp
Pt. S.W. 4-17-7E.—boundaries run
S.E. 5-17-7E. (Joseph Donald)
Re: acreage for Fr.S.W.5-17-7E.
N.W. Sec. 1-16-4E.
Investigation survey Cram and Deep Creek Dams

1945—46

1/45 Netley Marsh Prel. Survey
2/45 Delta Marsh Prel. Survey
5/45 Fisher River Fur Rehab. Project
6/45 Subdiv. Twps. 53 & 54, Rges. 27 & 28W.
7/45 Special Survey of Selkirk & Parish of St. Clements
8/45 Retracement, Twps. 8 & 9, Rge 12E.
9/45 Mafeking Townsite & Dolaine & Kirk Creeks—E. Gauer
10/45 Birch River Land Settlement Project
Spruce Woods—Twp. 9-14W.
E. Gauer
Misc. Section 29-13-13W.
Neepawa Court House & L.T.O. Bldgs.
Chemahawin I.R. No.32 (Cedar Lake)
Grace Lake—Site for Air Base
Summer Home Sites—Lake Athapapuskow

1946—47

3/46 Duck Mountain F.R. (Subdiv.)
5/46 Fisher River Fur Rehab. Block
7/46 Special Survey Town of Selkirk & Parish of St. Clements
10/46 Birch River Land Settlement Project (Retracement)
11/46 Whiteshell Summer Resort Lots (Subdiv.) & Pointe du Bois
12/46 Snow Lake Townsite
13/46 Parish of St. Francois Xavier (South side of River)
Misc. Townsite near Goldbeam Mines Ltd.
Proposed rearing pond and garage site at Trout Hatchery, West Hawk Lake
Catfish Creek Area (Inspection)
2 Fishing Sites on Lake Wpgosis.
Pointe du Bois—Summer resort lots
Reconnaissance survey—Man.-Ont. Bdy.
West Hawk Lake—Dine and Dance Hall
Breezy Point (Netley Marsh)
S.E. 29-17-11E.—creek—Great Falls

1947—48

3/47 Duck Mountain F.R. (Subdiv.)
5/47 Fisher River Fur Rehab. Block
6/47 The Pas—Subdiv. Twps. 54 & 55 Rges. 29 & 30W.P.M. Man.-Sask. Bdy.
Ontario-Manitoba Boundary—Echoing River to Hudson Bay
11/47 Whiteshell Summer Resort Lots
13/47 St. Francois Xavier Parish
14/47 Porcupine F.R. (Subdiv.)
15/47 St. Malo Settlement
16/47 Washow Bay Land Sett. Project
Misc. Great Falls S.E. 29-17-11E.
L.S. 8 of Sec. 29-12-12W.
Gimli—Lot for Man. Tel. System
Municipality of Fort Garry
Contour Survey at Sport Fish Hatchery
Netley Marsh—road S.E.16-15-5E.
Bissett—Subdiv. of Lots—D. Guard
Long Lake—Subdiv. of Lots—D. Guard
Gladstone—2 dam sites—Whitemud River
Birtle—Survey of Dam—D.E. Guard
Headingley Highway—D.E. Guard
Virden—Game Preserve Boundary—D. Guard
Brandon—R.C.M.P. Radio Station—D. Guard
Beausejour—East Boundary 15-16-8E.
Fr. N.W. Sec. 9-15-5E.—D.N. Sharpe

1948—49

3/48 Duck Mountain F.R. (Subdiv.)
11/48 Subdiv. of Lots (Whiteshell F.R.)
13/48 Parish of St. Francois Xavier
16/48 Washow Bay Land Sett. Project
17/48 St. Peters Parish (Retracement)
18/48 Poplar Point Parish Lots 1—21
19/48 McArthur Falls Subdiv.
20/48 Berens River Div. Project
21/48 Northern Man. Surveys (Churchill, Cranberry Portage etc.)
22/48 Cat Creek District Control Survey
23/48 Pine Falls Power Develop. Survey

1949—50

3/49 Duck Mountain F.R.
7/49 Town of Selkirk & Parish of St. Clements
10/49 Birch River Land Sett. Project
10A/49 Birch River Land Sett. Project
11/49 Whiteshell Summer Resort Lots
13/49 St. Francois Xavier Parish
17/49 St. Peters Parish—retracement
21/49 Churchill—Inspection of Buildings
22/49 Cat Creek Dis. Control Survey
23/49 Pine Falls Power Develop. Project
23A/49 Pine Falls (Severance Line)
24/49 Summer Resort Subdivs. Northern Manitoba (Manistikwan, Athapapuskow, etc)
25/49 Winnipeg River Summer Resort Survey
26/49 Bullhead Pt. Twps. 29 & 30, Rges. 2, 4 and 5E.

1950—51

11/50 Whiteshell F. R. & Winnipeg River Summer Resort Lots
15/50 St. Malo Settlement
17/50 St. Peters Parish Retracement Survey
21/50 North. Man. (Churchill)—A. G. Larson
Ont.-Man. Boundary—Monumenting bdy. Echoing River to Hudson Bay
23/50 Pine Falls Power Dev. Severance & Transmission Line
26/50 Bullhead Point Twps. 30 & 31, Rges. 2 to 5 E.P.M.
27/50 Proposed Red River Diversion Channel
28/50 Red River Emergency Dyking Board—Greater Winnipeg
29/50 Catfish Creek Retracement Survey
30/50 22nd Base Line Survey Rges. 1 to 14 W.
31/50 Carrot River Valley Survey
Misc. Dawson Road—St Boniface
D.E. Guard
Brandon—R.C.M.P. Radio Station Site
Air Base—Grace Lake Fr. S½ 12-56-26W—D.E. Guard
Lot for R.C.M.P. at Norway House
D.E. Guard
Berens River—Lot for Game & Fisheries
Parish of St. Boniface—Spec. Surv. of Blks. 1, 2, 3, Plan No. 1182 W.L.T.O. etc.
St. Charles—Layout of Location for Trans. Canada Antenna for R.C.M.P.
Hoop-n-holler cut-off—High Bluff
C. Brock
Lac du Bonnet—Summer Resort Secs. 29 & 30-16-13E.—D. Guard
Assiniboine River Diversion—Parishes of Portage la Prairie & High Bluff
C. Brock
Norway House—Hudson Bay Co.—Lot A—G.H. Herriot
Poplar Bay—Survey of Lots D.E. Guard
Bird River—Site for Radio Relay Station—D. Guard
Fisher Bay—Chained Traverse on Ice to Provide Mapping Control
Wm. Hayward

1951—52

3/51 Duck Mountain Forest Reserve
15/51 St. Malo Settlement

17/51 St. Peters Parish Retracement Survey
19/51 McArthur Falls Subdiv. Control for photo mapping
21/51 Churchill Townsite—Additional Lots
3A/51 Pine Falls Power Sev. Line
24/51 Northern Man.—Summer Resort
28/51 Greater Winnipeg Dyking Brd.
29/51 Catfish Creek Retracement Survey
30/51 22nd Base Line—Ranges 14—29W.
31/51 Carrot River Valley Survey
32/51 Fisher Bay Twp. Outline Survey
33/51 Lorette Parish Retracement Survey
34/51 Berens River Control Traverse C.F.A. (Kinwow Bay)
Misc. Arborg—Sec. 33-21-2 E.P.M.—Retracement—R. Tate
Westray—Layout of Townsite Subdiv.—C.E. Brock
Thicket Portage—Laying out add'l Lots—C.E. Brock
Novra—Road—Novra Station Grounds—C.E. Brock
Delta—Fr. 16-14-7 W.—D.N. Sharpe
Minnedosa Bird Sanctuary & Spruce Woods Game Preserve G. Goldsworthy
Dept. of Transport—Survey of various Airports in Man.—G. Goldsworthy
Hodgson—Site for Forestry Cabin
Road in Sec. 18-29-1 W. for For. Br. Turtle Mountain F.R.
Summer Resorts—Red River North of Selkirk
Resurvey of S.W. 31-21-1 E. G. Goldsworthy
Poplarfield—Twps 22 & 23, Rge. 1 W. G. Goldsworthy
Bird River—Site for Radio Relay Station

1952—53

11/52 Whiteshell F.R. Summer Resort Survey
19/52 McArthur Falls Expropriation Survey
30/52 22nd Base Line Survey
34/52 C.F.A. Traverse of Long Point, Lake Wpg. & Winter Road, Norway House to Island Lake
36/52 Parish of St. Charles—Retracement
37/52 20 th Base Line Survey
Misc. Poplarfield—Twps 22 & 23, Rge.1 W. and N½ 16-22-1 E.P.M.
G.J. Goldsworthy
Baldur—S.W. 11-5-14 W.
Shoal Lake—Fr. N.E. 32-17-23 W.
Libau—S.W. 18-15-6 E.
Porcupine F.R.—Forestry Road
Birch River—Drain through S½ 21-41-24 W. and Traverses of Indian Birch River, etc.
Matlock—L.S. 14, Sec. 36-16-4 E.
Morden—Dam Site P.F.R.A.
Souris—Dam Site P.F.R.A., S.W. 17-14-11 E.—Land Available for Summer Home Sites
Lake Man.—Survey of Boundaries of Air to Air Firing Range on Ice—Game & Fish

1953—54

11/53 Whiteshell F.R.—Subdivision of Summer Resort Lots
19/53 McArthur Falls—Severance line
34/53 Control Traverse C.F.A.—Cobham River to Mukutawa River
35/53 Rat River Settlement Survey
Misc. Seven Sisters—Subd. Pt. L.S. 1 and 8, Sec 5 and Fr. S.W. 17-14-11 E.
Hadashville—Site for Ranger Station & Road to Forest Nursery
Seven Sisters—Subd. Pt.Sec. 5, Pt. Sec. 7-14-11 E.
Mud Falls—Investigation Survey D.E. Guard
Baldur—Resurvey & Traverse of Water Area
York Factory—School, Game & Fisheries Sites
Oakburn/Shoal Lake—S.W. 29-19-22 W.—Resurvey & Trav. of Water Area
St. Charles—Replacement of Survey Monuments
Rat River Breeding Co-op. L.S. 1 Sec. 32-5-4 E.
Carman & Morden—Approch to Dam Sites
Pine Falls—West Limit of Site for Power Plant
Silver Falls—Site for Subdiv. of Lots
Lake Manitoba Air to Air Firing Range (Winter)

1954—55

11/54 Whiteshell F.R.—Summer Resort Lots
19/54 McArthur Falls Severance Line
21/54 Churchill—Addition to Townsite
23/54 Pine Falls Generating Station—Retracement of Severance Line
24/54 Northern Surveys —Rocky Lake
31/54 Carrot River Valley Survey
39/54 23rd Base line Twps. 89 to 92 E.P.M.
40/54 C.F.A. Control Traverse Survey—Goldsand Lake
Misc. Roseisle—Survey of Road through S½ 30-6-7 W.
Silver Falls—Subdiv. Pt. Lot A, Plan 3301
Breezy Point—Subdiv of Lots
Hole River—Survey of Dock
Mud Falls—Subdiv. Survey—E. Gauer
Cormorant Lake—Survey of Lake Dock Site
Assiniboine River Cut-offs in St. Francois Xavier & Baie St. Paul
Washow Bay—Survey of Drains & Road

1955—56

3/55 Duck Mountain F.R.
11/55 Whiteshell F.R. Summer Resort Lots
19/55 McArthur Falls Sev. Line
24/55 Summer Resort Surveys—Bakers Narrows, Rocky Lake, Manistikwan
31/55 Carrot River Dykes
41/55 The Pas, Wabowden, Lynn Lake Townsites
42/55 21st Base Line Survey—Twp. 80.,Rges. 1—10 W.
Misc. Virden—Building Site—Plan 2088
Richer—Admin. Site—Forestry Branch
Washow Bay—Survey of Drains
St. Laurent—Special Survey Sec. 32-15-5 W.
Breezy Point—Subdiv. of Lots J.Stewart
Poplarfield—N½ Sec. 30-21-1 E. J. Stewart
Lac du Bonnet—Sec. 22-15-12 E. T. Stevens
Poplar Bay & Lee River—Subdiv. of Summer Resort Lots—T. Stevens
Poplar Point Parish—Spec. Survey P. Baldock
Porcupine F.R. Forestry Road
Sans Souci—Inspection for L.T.O.
Wallace Lake—Additional Lots
Rabbit Point—Settlement Twp. 33-5 E.
High Bluff—P.F.R.A.
Washow Bay—Survey of Roads

1956—57

11/56 Whiteshell Summer Resort
19/56 McArthur Falls—N.W. 27-15-11 E.
21/56 Northern Manitoba Churchill
24/56 Northern Man. Summer Resorts
29/56 Catfish Creek Retracement Survey
31/56 Carrot River Valley Survey
38/56 Lynn Lake, Berge Lake & Zed lake
43/56 Township Outline—Moak-Mystery Lake Area
44/56 Cat Lake Trans. Line
Misc. Singoosh Lake Road—D.W.Crandall
Brokenhead I.R.—J. Stewart
Rouseau River I.R.—D.W. Crandall
Peguis I.R.—D.W. Crandall
Fisher River I.R.—J. Stewart
Fort Alexander I.R.—J. Stewart
P.T.H. No 10—The Pas
Drain through Twp. 5, Rges. 3 & 4 W.—Tobacco Creek—D.W. Crandall
Drain through Twps. 16 & 17, Range 3 E.—Netley Creek—D.W. Crandall
Drain through Township 12, Rge. 6 E.—Satans Creek—D.W.Crandall
Road Diversion Sections 20 & 21, Twp. 10, Rge. 6 E.P.M.

1957—58

10/57 Birch River Settlement
11/57 Whiteshell Summer Resort
24/57 Northern Summer Resort Surveys
29/57 Catfish Creek Survey
31/57 Carrot River Valley Survey
45/57 Assiniboine River Dykes P.F.R.A.
46/57 Bird Lake Subdivision
47/57 Man.-Northwest Territories Bdy.
48/57 Kelsey Generating Station
Misc. Section 5-14-11 E.—Road
Pt. Rv. Lot 88, Parish of St. Clements
Section 14-5-4 W.—Drain
Whitemouth—Forest Ranger Site
Powerview—Lt. 22, Twp. 18-10 E.—Road
St. Pierre—Carey Road
Addition to Beaver Creek Subdivision
Lots 28 & 29, Poplar Bay Subdivision; Grace Lake—Dyke
Pt. S.W. 12-56-17 W.
Beaver Creek South—Subdivision

1958—59

3/58 Duck Mountain F.R.
10/58 Birch River Settlement
11/58 Whiteshell F.R.
24/58 Summer Resort Surveys—Northern Manitoba
29/58 Catfish Creek Survey
31/58 Carrot River Valley (Pasquia)
43/58 Township Outline—Twps. 76—79, Rges. 2,3 & 4 W.
45/58 Assiniboine River Dykes
47/58 Man.-Northwest Territories Bdy.
49/58 Man. Hydro-Electric Board
(a) Terminal Stations
(b) Trans. Line
(c) Greater Winnipeg Perimiter Trans. Line
50/58 St. Malo & Rivers—Dam Site & Severance Area
Misc. Boissevain Reservoir & Sites for two Dams. P.F.R.A.

Bower Lake—Subdivision of lots
Bird River Subdivision (Lands Br.)—Bridge
Breezy Pt. Subdivision—Addition
Lac du Bonnet—Resurvey of Brookfield on Wpg. River.
Pt. S.W. 1-16-12 E. & S.E. 2-16-12 E.—Subdivision of Lots
Black Island in Lake Winnipeg
Grace Lake Dyke Sec. 13-56-26 W. & Sec. 8-56-25 W.
St. Ambroise—Road Survey
Pointe du Bois—Summer Resort Lots
Wanipigow Lake—Subdivision of Lots
Pine Creek I.R. No. 66A
Recreational Sites

1959—60

11/59 Whiteshell F.R.—Summer Resort Lots
31/59 Carrot River Valley (Pasquia)
41/59 Northern Townsites
47/59 Man.-Northwest Territories Bdy.
49D/59 Brandon Trans. line
(a) Greater Wpg. Perimiter
(b) Selkirk Transcona Trans. Line, Pine Falls Generating Station—Man. Hydro Board
49E/59 Kelsey-Thompson Trans. Line
50/59 Rivers—Dam Site Severance Line P.F.R.A.
Neepawa—Reservoir & Dam Site
51/59 Sandilands F.R.
Misc. Pinawa Bay—Add. to Subdivision
Sec.1-16-12 E.P.M.—T. Stevens
Arbor Island—Max Lake—Turtle Mtn. Sec. 30-1-20 W.—T. Stevens
Mud Falls Addition—Subdivision—S.E.¼ Sec. 29-17-11 E.—T.Stevens
Boissevain—Summer Resort Lots
T. Stevens
Poplar Bay—Subdivision of Lots
Road—Sec. 6-3-5 W.P.M.—T. Stevens
Beaver Creek—Add. to Subdiv.
Hadashville—Add. to Admin. Site
Morden—Road Sec. 6-3-5 W.P.M.
T. Stevens
High Bluff—Recreational Site
A.C. Roberts
Recreational Sites—Pt. Block 7, Plan V35 Sec. 22-12-29 W.
Recreation Site Pt. N.E. Sec. 6-11-26 W.
Recreational Site—Souris
N. Recreational Area—Access Road

1960—61

3/60 Duck Mountain F.R.
11/60 Whiteshell F.R. Summer Resort Lots
23/60 Pine Falls Severance Line
24/60 Northern Manitoba Surveys—Summer Resort Lots
31/60 Carrot River Valley (Pasquia)
47/60 Man.-N.W.T. Boundary
49B/60 Selkirk-Transcona Trans. Line
49C/60 Greater Wpg. Perimiter Trans. Line
49F/60 Brandon-Rosser Trans. Line
50/60 P.F.R.A. Reservoir on Mary Jane Creek at Manitou
51/60 Sandilands F.R.
52/60 Man.-Sask. Bdy.
53/60 Moose Lake Settlement (Grand Rapids Forebay)
Misc. Traverse Bay—Fr. S½ 14-19-8 E.
Bird River—Pt. L.S. 2, 7-17-14E.
Williams Lake
Hannesson's Fishing Camp (Leaside Beach Subdiv.)
Matheson Island Landing (Island View Subdivision)
Brandon—Survey Inspection
Brochet—Hudson Bay and other lands
Nelson House—Wharf Site and other lands
Ospwagan Lake—Subdiv. of commercial lots—Aircraft Companies
Atikameg Lake—Subdiv. for Forestry
Dauphin—Roadside Park
Little Bullhead Point Subdiv.
Sec. 34-15-12 E. & Sec. 3-16-12 E.—Subdivision of Lots—Lands Branch
Resurvey of Sec. 18-12-25 W.
Survey Road to North Star Mine & Fishing Site No. 224—File 25
Rivers Dam Site P.F.R.A.
Gypsumville—Forestry Lot in N.E.¼ Sec. 22-32-9 W.
Resurveyed Lots 1—4 in S.E. 7-17-14E.P.M.
Central Whiteshell Road Secs. 27—29 & Pt. Sec. 22-13-14 E.
Subdiv. Survey of N½ Sec. 15-15-5 E.—L. Boutilier
Flin Flon—resurvey of road—Waldron
Simonhouse Lake—Picnic Camping Ground—M. Foster
Icelandic Dock Site—Matheson Island—M. Foster
Hatchery Road—West Hawk Lake
M. Foster
Paint lake—Subdiv. of 40 Lots
T. Stevens
Wawanesa—Rec. Site—M. Foster

1961—62

1A/61 Gypsumville-Interlake—Control Survey
1B/61 Gypsumville-Interlake—Control Surveys CFA
3/61 DuckMountain F.R.
4/61 Agassiz F.R.
11/61 Whiteshell Summer Resort Lots & Control Survey
19/61 McArthur Falls—Severance Line
24/61 Northern Manitoba—Summer Resorts
25/61 Winnipeg River Summer Resort Survey
31/61 Pasquia Land Settlement
47/61 Manitoba-Northwest Territories Bdy. (Add. Observations) A.C. Roberts
49B/61 Selkirk-St Vital (Transcona Trans. Line)
49F/61 Brandon Rosser Trans. Line
49G/61 Selkirk-Rosser Trans. Line
49H/61 Grand Rapids-Rosser Trans. Line
49I/61 Thompson—Right-of-Way Requirements
50/61 P.F.R.A.—Parish of Baie St. Paul
51/61 Sandilands F.R.
52/61 Manitoba-Saskatchewan Boundary
53/61 Grand Rapids Forebay (Moose Lake & Cedar Lake Survey)
53C/61 Grand Rapids Forebay—Levels, Summerberry Muskrat Trapping Area
54/61 Legal Surveys:
Minnedosa—Prov. Rec. Area Sec. 9-16-18 W. —L.E. Boutilier
Ironwood Point—Lot Twp. 19, Rge. 7 E.
M.Q. Foster
Bissett—San Antonio Mines—Lot
M.Q. Foster
MacGregor—Legal Survey—Subdiv.
M.Q. Foster
Delta—Legal Subdivision of Lots
Misc. Surveys vicinity of Thompson, Paint Lake & The Pas
55/61 Retracement Surveys:
Gull Harbour Recreational Area
T. Stevens
Location Survey—Patricia Beach Rec. Area—M.Q. Foster
Delta Area—Retracement for Game Branch—M.Q. Foster
Lockport—Rec. Area—Retracement
A.C. Roberts
MacGregor—Land for Crown along Highway—A.C. Roberts
56/61 Grand Rapids Settlement
L.E. Boutilier
Misc. Road in Sec. 14-3-14 W.—Rock Lake
M.Q. Foster
McGregor—Survey of piece of land Indian Metis Project
McGregor, La Salle, Plumas, Westbourne—Sites for Dams
Bird Lake—Subdiv. of Lots M.Q. Foster

1962—63

1A/62 Interlake Control Survey C.F.A. (Surveys Br.)
1B/62 Interlake Control Survey C.F.A. (Forestry)
3/62 Duck Mountain F.R.
11/62 Whiteshell—Summer Resort Surveys
20/62 Southern Manitoba—Summer Resort Surveys
24/62 Northern Manitoba—Summer Resorts
25/62 Winnipeg River—Summer Resort Survey
31/62 Pasquia Settlement
49G/62 Selkirk-Rosser—Trans. Line
49H/62 Grand Rapids-Rosser Trans. Line
50/62 P.F.R.A.—Dams, Dykes, Sev. Lines
52/62 Manitoba-Saskatchewan Bdy.
53A/62 Moose Lake Subdiv.—posting
53B/62 Cedar Lake—Townsite Survey
54/62 Legal Surveys (General):
MacGregor Subdivision—M.Q. Foster
St. Laurent Subdivision—T.H. Stevens
Flea Island Indian Entrenchment
T.H. Stevens
Neepawa—Roadside Park
T.H. Stevens
Little Grand Rapids Settlement
M.Q. Foster
St.Genevieve—Forestry Br.
T.H. Stevens
Cormorant—Settlement Survey
T.H. Stevens
R.M. of Cypress—Road—T.H. Stevens
55/62 Retracement Surveys (General):
Pelican Lake Survey—M.Q. Foster
Deloraine—M.Q. Foster
St. Lazare—T.H. Stevens
Swan River—S.E.¼ 11-35-29 W.
T.H. Stevens/W. Jaster
Monumentation—J.A. Beck
Oak Hammock Marsh
T.H. Stevens/R.Q. Bastin
56/62 Grand Rapids—Subdivision

1963—64

1A/63 Interlake Control Survey (Surveys Br.)
1B/63 Interlake Control Survey C.F.A. (Winnipegosis)
4/63 Agassiz & Belair F.R.
11/63 Whiteshell F.R.—Summer Resort Lots etc.
20/63 Southern Man. —Summer Resort Surveys (Grand Beach)
21/63 Northern Manitoba (Churchill)
24/63 Northern Manitoba—Summer Resort Lots (Paint Lake Subdiv.)

25/63 Winnipeg River Summer Resort Surveys
31/63 Pasquia Settlement
35/63 Rat River Settlement
37/63 20th & 23rd Base Line Survey
50/63 P.F.R.A.—Dams, Dykes, Sev. lines
53A/63 Grand Rapids Forebay—I.R. Moose L.
53B/63 Grand Rapids Forebay (Summerberry, Cedar Lake & Easterville)
54/63 Legal Surveys (General):
Kerr Lake—T.H. Stevens
Wabowden Subdiv.—M.Q. Foster
Thompson—Trans. line—M.Q. Foster
R.M. of South Cypress—Road
T.H. Stevens
Cranberry Portage (Commercial)
Buffalo Wallow near Melita
55/63 Retracement Surveys—General:
Belair F.R.—Outline Survey
L.E. Boutilier
Josepha Lake Resurvey—T.H. Stevens
Thompson—Inspection—M.Q. Foster
Selkirk—Loc. of Church & Cem.
Rat River Settlement
56/63 Grand Rapids Subdivision

1964—65

1A/64 Interlake Control Survey (Surveys Br.)
1B/64 Interlake Control Survey C.F.A. (Forestry)
2/64 Provincial Parks
3/64 Duck Mountain F.R.
5/64 Township Outline Surveys C.F.A.
11/64 Whiteshell Summer Resort
20/64 Southern Man.—Summer Resort
24/64 Northern Man.—Summer Resort
25/64 Winnipeg River—Summer Resort
31/64 Pasquia Settlement Project
35/64 Rat River Settlement
37/64 20th & 23rd Base Line
50/64 P.F.R.A. Surveys of Dams, Dykes, etc.
50A/64 Shellmouth Dam (P.F.R.A.)
52/64 Manitoba-Saskatchewan Bdy.
53A/64 Grand Rapids Forebay I.R.—Moose L.
53B/64 Grand Rapids Forebay
54/64 Legal Surveys (General):
Cormorant Lake—M.Q. Foster
Easterville—Industrial Area
55/64 Retracement Surveys (General):
Poplar Point
Whitewater Lake
Duck Bay—Camperville location
Misc. Grand Rapids—Contour Survey—Fish Hatchery
Northern Man.—Summer Lots
Grand Rapids—Location Survey for Fisheries

1965—66

2/65 Provincial Parks
5/65 Township Outline Surveys
6/65 Delta Marsh Surveys
11/65 Whiteshell—Summer Resort Lots
14/65 Porcupine F.R.
20/65 Southern Man.—Summer Resort
24/65 Northern Man.—Summer Resort
31/65 Pasquia Survey
45/65 Assiniboine River Location Survey
50/65 P.F.R.A. Surveys of Dams, Dykes, etc.
52/65 Manitoba-Saskatchewan Boundary
54/65 Legal Surveys (General):
Dawson Bay—Subd. of Sett.—R.Q. Bastin
Grand Rapids—Subd. Reposting—T.H. Stevens
Survey of Lot & Access for M.G.A.S.
T.H. Stevens
55/65 Retracement Surveys (General):
S.S. Poplar Point—L.E. Boutilier
Surveys using Helicopter
M.Q. Foster
Dropmore & vicinity—Extension
T.H. Stevens
Shellmouth Area (Tellurometer)
T.H. Stevens
Assiniboine River—M.Q. Foster
Warehouse Site, etc. The Pas
R.Q. Bastin
Birds Hill Prov. Park—R.Q. Bastin
Dropmore—T.H. Stevens
Part Parish of St. Peters—R.Q. Bastin
Misc. Railway at Atik—M.Q. Foster
Cormorant—Levels—M.Q. Foster
Grand Beach—South Lot—R.Q. Bastin
Camperville—Duck Bay—Levels
L.S. Brooks
Delta Marsh—Contours
A. Razansoff
The Pas & Flin Flon
Flin Flon—Dept. Building Lot
R.Q. Bastin
Ste. Anne—Investigation of Gravel Pit—A.C. Roberts

1966—67

1B/66 The Pas—Pinpoint survey
5/66 Township Outline Survey
5A/66 Township Outline Survey
7/66 Vertical & Horizontal Control For Mapping
8/66 Lake Winnipeg Contour Survey
9/66 Northern Control Surveys
11/66 Whiteshell—Summer Resort Survey
20/66 Northern Man.—Summer Resort
45/66 Assiniboine River—Location Survey
50/66 P.F.R.A. Surveys of dams, dykes, etc.
52/66 Man.-Sask.—Boundary Survey
52A/66 Man.-Sask.—Bdy. Survey—Flin Flon
53A/66 Moose Lake—Control Traverse
54/66 Legal Surveys:
Gillam—Sett. Survey—M.Q. Foster
Prov. Park on T.C.H. near Sydney
M.Q. Foster
Norway House—School Site
T.H. Stevens
Cranberry Portage Commercial Lots
Gillam—Subdiv. Preliminary
M.Q. Foster
Arnot—Mill Site—M.Q. Foster
Oak Point—Hatchery Access
M.Q. Foster
Cranberry Portage—Commercial Site
D.W. Crandall
The Pas—Plant Site—Churchill Forest Products—M.Q. Foster
Nutimik—Pt. Sec.33-13-14 E.
T.H. Stevens
Dawson Bay—Church & Cemetery Lot—Location Survey for Sett. & future subdiv.—D.W. Crandall
55/66 Retracement Surveys:
Oak Lake—T.H. Stevens/M.Q. Foster
Big Eddy, The Pas—Investigation Area north—D.W. Crandall
Norway House—School Site Contours
T.H. Stevens
Camp Hughes—Spruce Woods F.R.
T.H. Stevens
Misc. The Pas—Bridge Site—Tellurometer
T.H. Stevens
Grand Rapids—Investigation—(Fish Hatchery Site) L.S. Brooks

1967—68

2/67 Provincial Parks
5A/67 Township Outline Survey
7/67 Vertical & Horizontal Control for mapping
7A/67 Sherridon—Control for Mapping
8/67 Lake Winnipeg—Contour Survey
9/67 Northern Control Surveys
11/67 Whiteshell—Summer Resort Survey
20/67 Southern Manitoba—Summer Resort
24/67 Northern Manitoba—Summer Resort
50/67 P.F.R.A. Surveys of dams, dykes, etc.
52/67 Man.-Sask Boundary Survey
53A/67 Moose Lake Control Traverse
54/67 Legal Surveys:
Russell—Surveys of Mrs. Simms Land (Wildlife Area) E.B. Flower
Binscarth—Assiniboine R. Loc.
M.Q. Foster
Arnes—Lot (Parks Br.—D.W. Crandall
Shell River—Parcel Adjacent Sec. 36-30-28 W.—M.Q. Foster
Gillam Townsite—M.Q. Foster
Arnes—Lot for Park—M.Q. Foster
Berens River—School Site
T.H. Stevens
Stead—Retracement of ¼ line (E/W) in Sec. 26-16-8 E.—T.H. Stevens
Hole River I.R.—School Site
T.H. Stevens
Red Deer River—Roadside Park
M.Q. Foster
Latitude at Peace Gardens
M.Q. Foster
55/67 Retracement Surveys:
Parish of St. Charles (Base Line)
D.W. Crandall
Birds Hill Park—M.Q. Foster
Camp Hughes—T.H. Stevens
Mystery Lake—Retracement & Inspection M.Cs. (Bellamy)
M.Q. Foster
Birds Hill Park—Special Survey
M.Q. Foster
Poplar Point—Special Survey
M.Q. Foster
Near Stead—T.H. Stevens
Poplar Point—M.Q. Foster
Poplar Point—Special Survey
M.Q. Foster
Turtle Mountain F.R. Boundary
M.Q. Foster
Bissett—Loc. Survey—T.H. Stevens
Turtle Mountain F.R.
Misc. Grand Rapids—Levels & Locations re. Fish Hatchery—Arda Office
L.S. Brooks

1968—69

2/68 Provincial Parks
7/68 Vertical and Horizontal Control for Mapping, 7A Sherridon Area
9/68 Northern Control Surveys
12/68 Special Surveys
20/68 Southern Man.—Summer Resort
45/68 Assiniboine River Location Survey
52/68 Man.-Sask. Boundary Survey
Misc. Lake Man. Narrows—Tellurometer
T.H. Stevens

PRODUCTION TABLES

Field Surveys (details available in Branch Records)	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80
Water Control	23	30	33	45	49	48	45	45	44	43	40
Northern Subdivisions/ Airstrips	8	5	9/1	13/1	5/1	7/2	14/8	5	10	15	13
Retracement	9	6	3	1	1	4	4	10	7	9	9
Park Subdivision	—	—	—	—	2	1	1	9	6	11	8
Crownland Subdivision	2	—	—	—	8	—	2	2	—	4	4
Northern Mapping Control	3	2	2	2	—	—	—	—	—	—	—
Special Surveys	1	—	—	—	—	3	—	—	2	1	3
Indian Land Exchange	—	—	—	—	—	2	2	1	—	—	—
Assiniboine River Dyking	—	—	—	—	—	2	—	—	—	—	2

Field Surveys (details available in Branch Records)	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Water Control	50	20	40	35	40	34	19	30	31	25
Crown Lands Branch	18	13	10	7	10	11	10	8	11	14
Parks Branch	5	6	6	2	6	6	3	3	2	6
Northern Subdivisions	17	11	18	13	13	10	5	6	8	6
Indian Land Exchange	—	—	1	—	—	—	2	—	—	1
Northern Flood Agreement	—	—	—	1	3	8	—	—	—	—
Special Surveys	10	2	7	4	2	3	—	—	—	—
Mapping Control/ Intergration	2	2	3	2	2	2	2	2	3	3
Retracement	11	6	8	2	2	10	10	9	11	7
Miscellaneous	5	1	2	14	10	8	6	3	4	3

(for details on control surveys 1973—90, see text)

MANITOBA GEOGRAPHICAL NAMES PROGRAM

Product	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90
Name Decisions	217	74	99	160	63	110	91	42	156	372
Commemorative Certificates	43	51	58	70	302	417	191	273	153	220
Manuscripts Checked	192	303	106	74	103	34	78	93	154	96
Supplementary Location Maps	27	15	31	116	169	36	54	21	11	213
Responses to Inquiries	390	427	575	650	865	780	835	959	1088	1173

LAND DESCRIPTION SERVICES

Product	83/84	84/85	85/86	86/87	87/88	88/89	89/90
Requests for Services	-	838	637	634	387	544	533
Legal Descriptions	810	651	681	335	335	532	343
Rights-of-Way	-	31	25	24	-	43	57
Area Calculations	46	81	127	46	46	93	102
Survey Requirements	-	10	24	17	8	10	17
Ducks Unlimited	-	8	11	5	7	7	9
Mines and Minerals	30	34	45	58	41	-	41
Consents and Orders of the Minister	-	36	43	30	38	32	59

PLAN DRAFTING

Product	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90
Plans of Surveys	83	99	128	175	165	61	55	81
Township Diagrams	20	16	8	19	29	36	20	63
Plan Revisions	-	263	351	225	483	319	277	367